



University
of Glasgow



University of
Strathclyde
Glasgow

WORKSHOP ON USING VIDEO IN COMPUTER SCIENCE
EDUCATION

SCAFFOLDING VIDEO ASSIGNMENTS IN CYBER SECURITY

<https://www.strath.ac.uk/staff/englishrosannedr/>



www.dcs.gla.ac.uk/~joseph



www.psy.gla.ac.uk/~steve

OVERVIEW

OVERVIEW

- contributions and motivation for using video assignments on two courses related to security.
- observations from these assignments, in terms of differences between artefacts produced on both courses.
- close with a discussion and some recommendations for performing such assignments in the future.

CONTRIBUTIONS

Why would you want to listen to this talk?

CONTRIBUTIONS



CONTRIBUTIONS



CONTRIBUTIONS



CONTRIBUTIONS



CONTRIBUTIONS



MOTIVATION

MOTIVATION



MOTIVATION



MOTIVATION



MOTIVATION



MOTIVATION



MOTIVATION



What is the real educational motivation?

CASE STUDIES

CASE STUDIES

Reflections on Video Assignments for Usable Security

Advanced Visual Interfaces, May 29, 2018, Castiglione della Pescaia, Italy

COMPOSITION		SPEAKER ROLES		TONE	
Description	Benefits & Concerns	Description	Benefits & Concerns	Description	Benefits & Concerns
Lecture. Teams would typically capture speakers using a smartphone camera giving a lecture with supporting slides in a theatre or group study facility.	Optimal for delivering knowledge, but less so for communicating the merits of an artefact, e.g. an interface. Speakers often struggled to interact with the artefact or supporting slides or material.	Instructor. The speaker would adopt the approach of teacher and methodically progress through a script or series of bullet points.	The approach was beneficial for nervous students that were not confident in the material or the areas being discussed, but such a style was not engaging or distinct. The approach does require some coordination between members.	Formal. The majority of speakers adopted a formal tone when delivering the presentation. The approach often exhibited planning, but also had the potential be disjointed as students would work on silo-ed segments.	The approach is generally optimal for conveying knowledge and the virtues of a particular interface or solution. However, speakers were often not engaging and often lacked imagination in terms of how to stimulate the audience.
Narration. Teams would typically capture a video pre-stream and then narrate over the recording, e.g. screen recording. It was also common for students to capture a traditional slide-deck and narrate.	A very common and relatively easy to capture presentation type. The type often lacked coherence and exhibited lack of planning as team members could remotely capture segments and stitch video together more than in other types. The videos would also often have distracting watermarks due to students using shareware.	Free-form. The free-form approach is a loosely structured video with the speaker seemingly progressing through the presentation with little structure. The approach often exhibited a lack of planning and coordination with speakers rambling through concepts and ideas.	The approach has the potential to be engaging, but only with considerable practice and experience. The reality is that this style often was exhibited by weak teams rushing to meet deadlines.	Conversational. The speaker would attempt to have a conversation with the audience. A challenge for a video presentation, but effective in engaging the audience with short sentences and a clear structure.	The approach arguably only worked well for those confident in language ability, i.e. native English speakers. While it is highly engaging, it often just demonstrated a team that was not prepared and was working to fill the time requirement of the assessment.
Advertorial. Teams would produce a video as a 'sales-pitch' or marketing video that would extol the virtues and benefits of the artefact they produced. The videos would typically be technically advanced and of a high-quality production.	The approach was often effective at demonstrating the effectiveness of the artefact and is also good at demonstrating consideration of context and the intended audience. However, the advertorial approach often failed to demonstrate critical thought and teams would neglect to cement aspects in evidence.	Storytelling. Speakers adopted an approach of telling stories and providing of examples to justify the approach to designing the artefact. The concern is that this suggested the artefact was informed by a few examples or stories, rather than addressing a core problem.	The approach is optimal at demonstrating key consideration of the problem area or intended audience. However, it can be time consuming and speakers would often spend considerable time delivering aspects of stories that were often of little relevance.	<div>PAPER - TABLE 1 OBSERVATIONS</div>	

Team members often was not a feature of disjointed presentations.

CASE STUDIES



CASE STUDIES



NARRATION STYLE - INSTRUCTOR ROLE - FORMAL TONE

ADVERTORIAL STYLE - FREEFORM ROLE - HUMOUROUS TONE

LECTURE STYLE - INSTRUCTOR ROLE - FORMAL TONE

CASE STUDIES



NARRATION STYLE - INSTRUCTOR ROLE - FORMAL TONE

NARRATION STYLE - FREE FORM ROLE - FORMAL TONE

NARRATION STYLE - INSTRUCTOR ROLE - HUMOUROUS TONE

CONTRAST

- **narration style** was favoured by many teams across both courses.
- **advertorial style** occurred more so regards the proactive password checker project.
- **humorous tone** was far more common with the technical assignment.
- **lecture style** was also far more present more with the proactive password checker assignment than technical solution.

HINDSIGHT

DIGITAL NATIVES DELUSION

experienced
consumers
(of video)



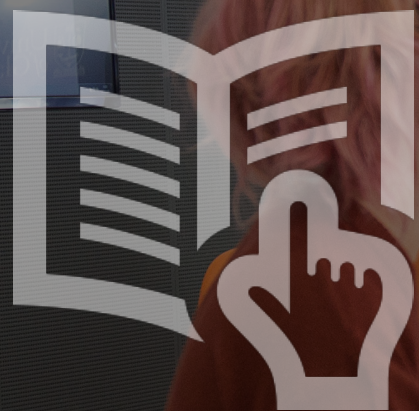
skilled
authors
(of video)

SCAFFOLDING VIDEO ASSIGNMENTS

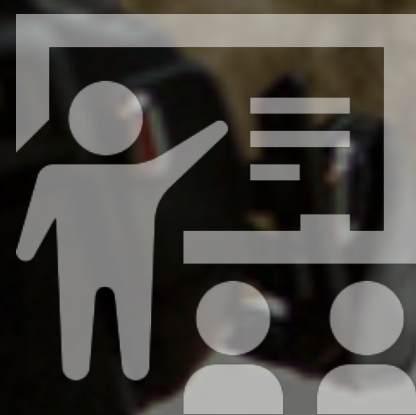






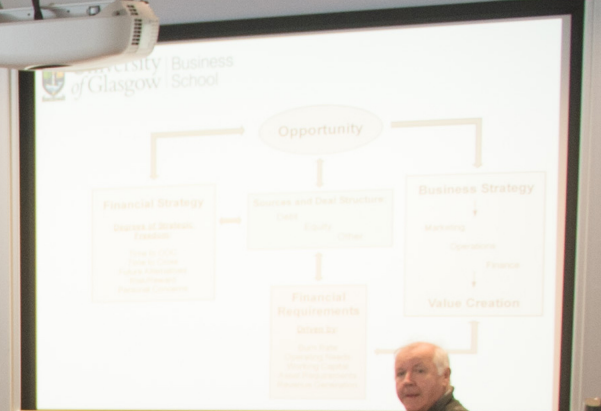
















CONCLUSION

CONCLUSION

- video assignments have the potential to utilise presentations more in learning and assessment.
- but, need to be careful not to fall for the digital native delusion.
- students need scaffolding and support to reach optimal outcomes.



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Glasgow

OVERVIEW

- outline approach to **learning and teaching** at the University of Glasgow and the School of Computing Science.
- **work-based learning** as an opportunity to deliver a professional degree for software engineers.
- discuss some of the **untapped possibilities** and challenges in partnering with companies as learning providers for students.
- outline **consultation period** to partner with companies to deliver strong degree programme in September 2019.

OVERVIEW



2017



2018



2019

OVERVIEW

2.00 pm Opening remarks.

2.15 pm Skills Development Scotland.

2.45 pm Possibilities of work-based learning.

3.00 pm Leidos experience.

3.20 pm Tea and coffee.

3.40 pm Open discussion.

4.00 pm Invitation for consultation.

4.20 pm Close





University
of Glasgow



THEORY + PRACTICE

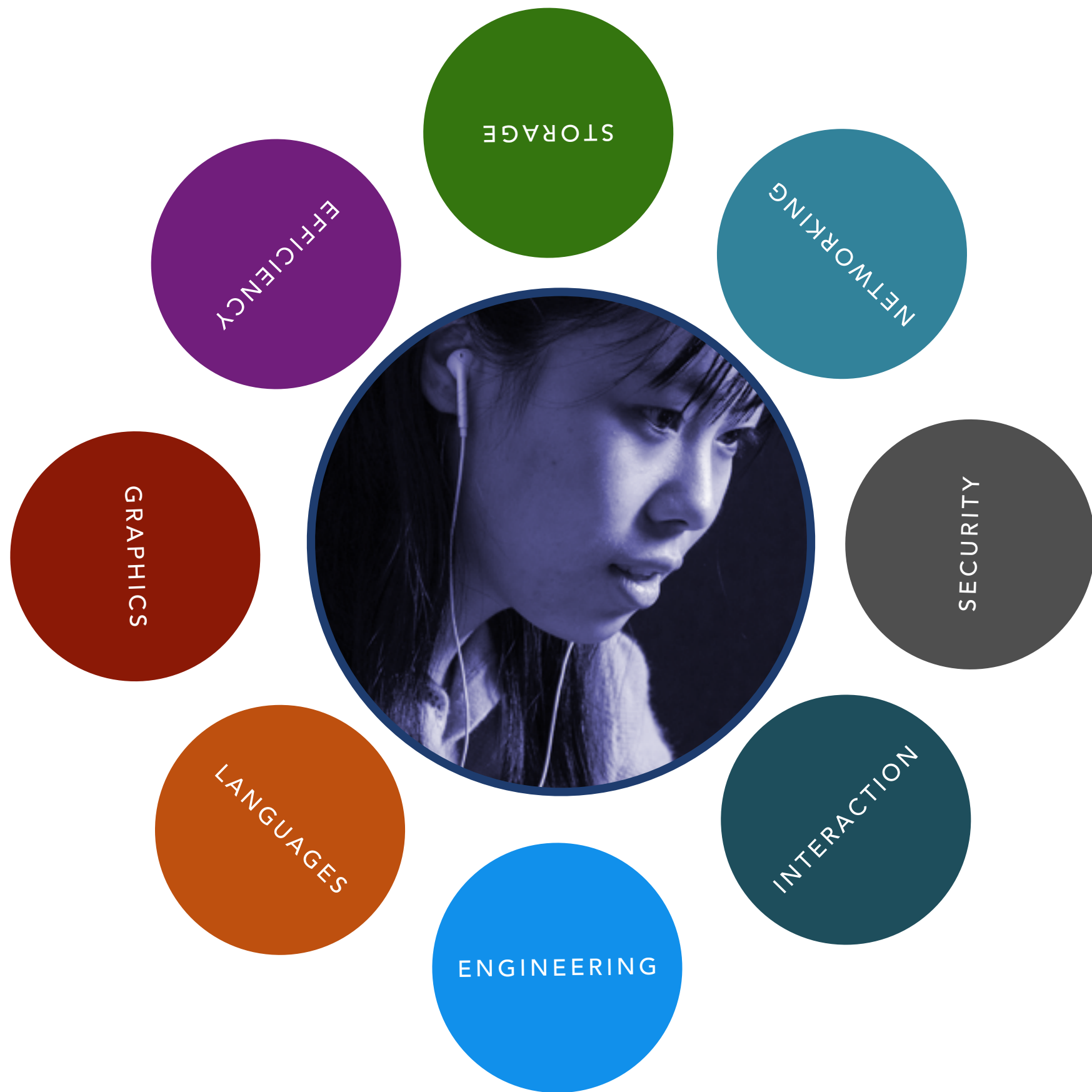


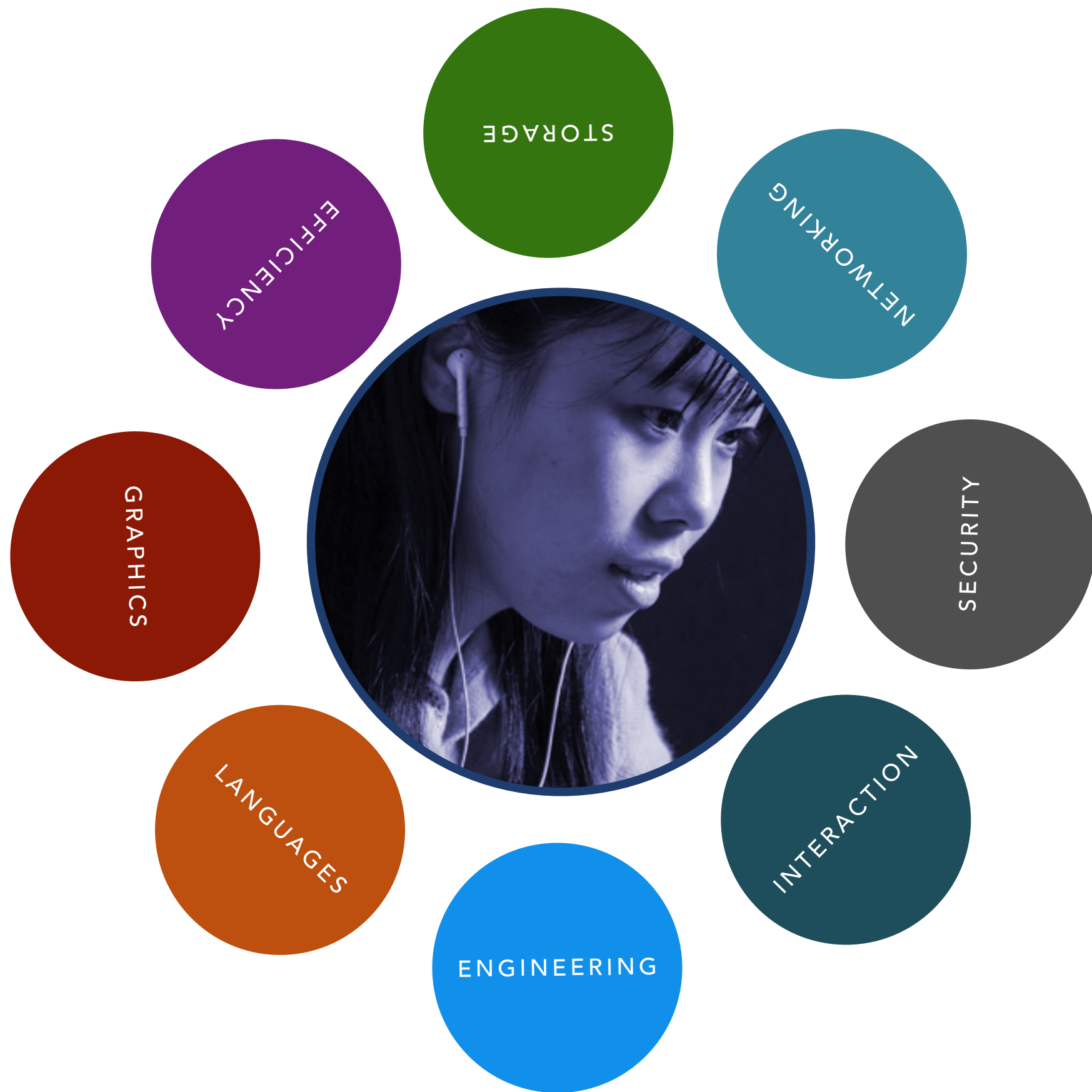














ENGINEERING

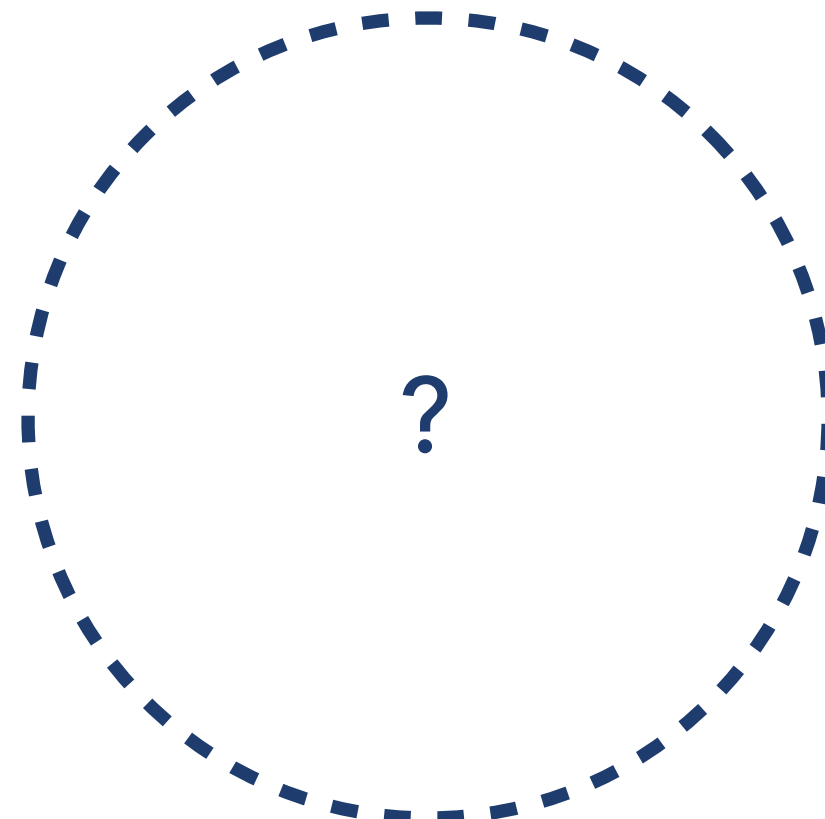
WORLD
HANGERS
WELCOME

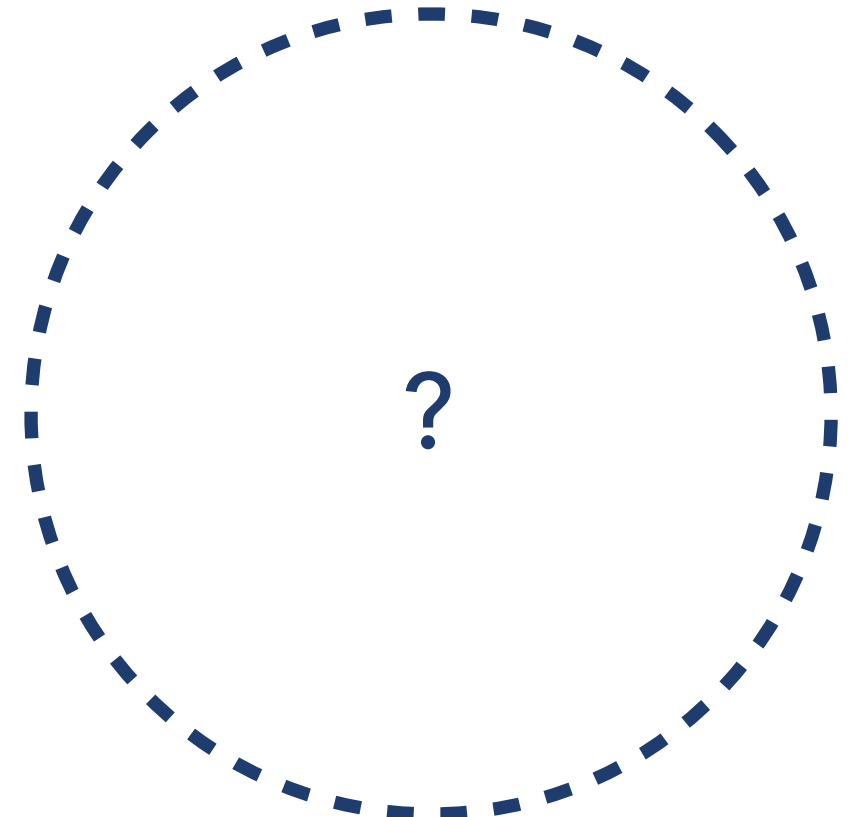


WORLD
CHANGERS
WELCOME

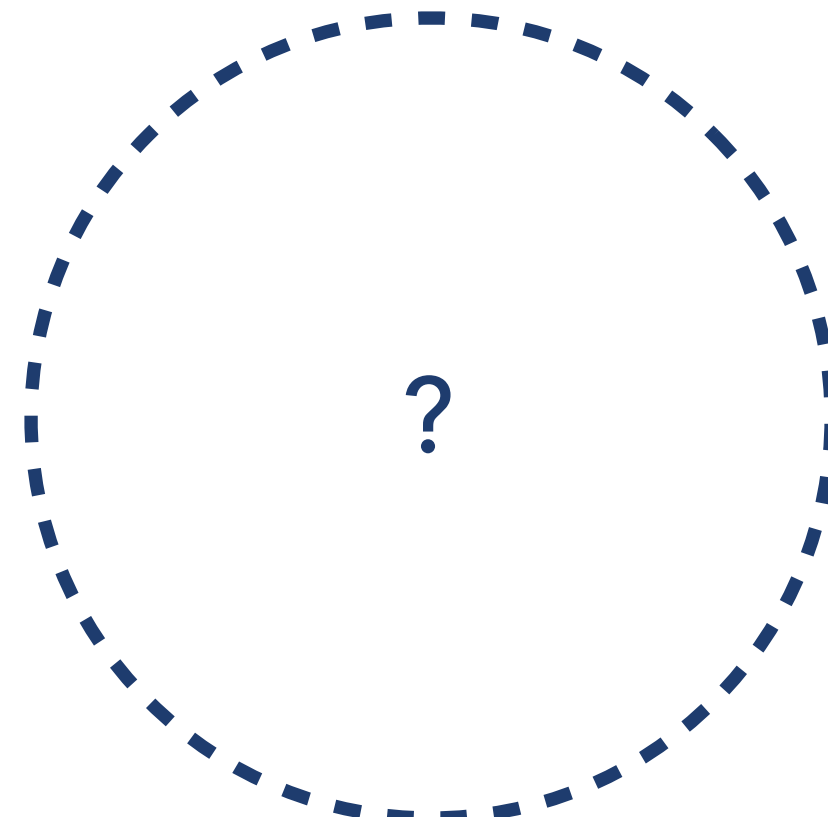




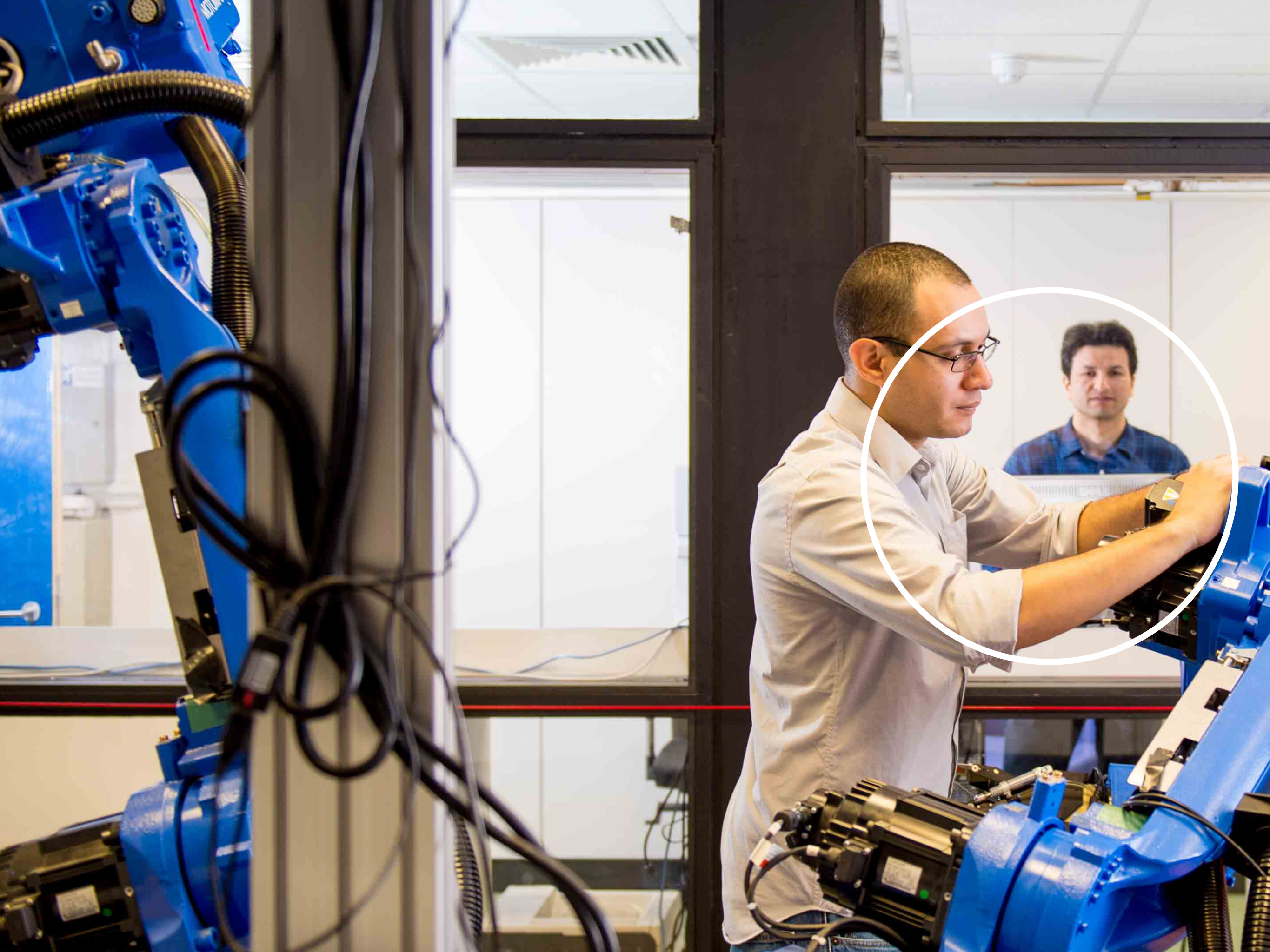




ACADEMIC
DEGREES



PROFESSIONAL
DEGREE





PROFESSIONAL
DEGREE



THEORY + PRACTICE

- **computing science plan** - focused on research and in-depth technical knowledge.
- **software engineering plan** - led-by research and focused on in-depth technical knowledge, but slightly constrained with some practice.
- **work-based learning plan** - partnering with industry and government to shape the profession of Software Engineering in Scotland.

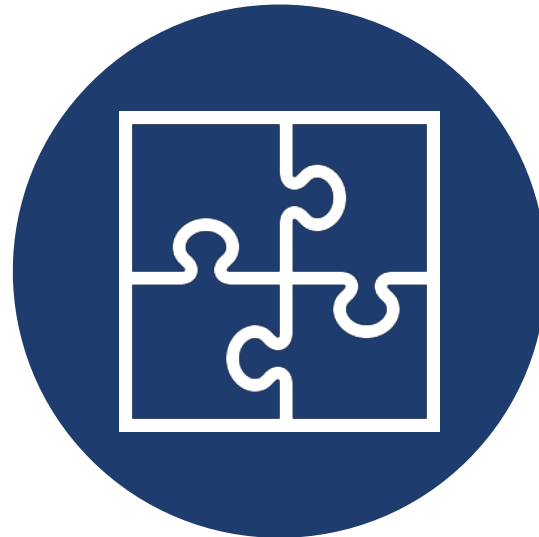
WORK-BASED LEARNING

WORK-BASED LEARNING

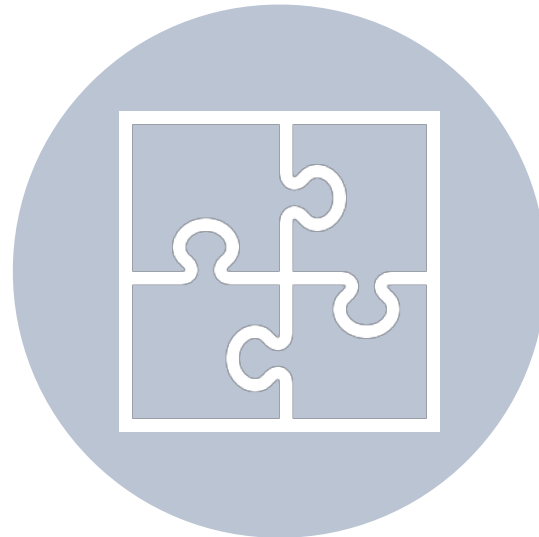
- there is not single clear definition of work-based learning.
- our perspective, that the workplace can act as the optimal learning environment for some concepts.
- aspiration is to partner with industry to produce a programme of learning for next generation professionals.
- Scottish Government has now released a series of frameworks to support funding for work-based learning.

BENEFITS FOR EMPLOYERS

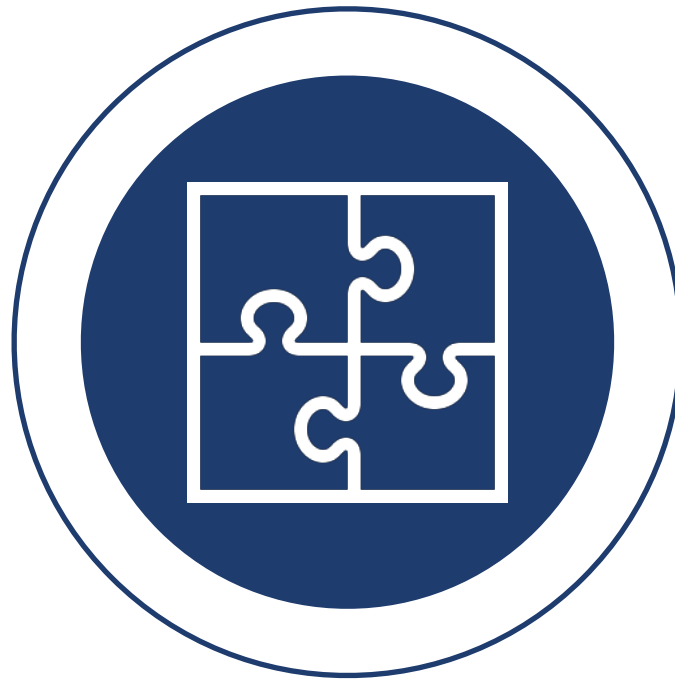
BENEFITS FOR EMPLOYERS



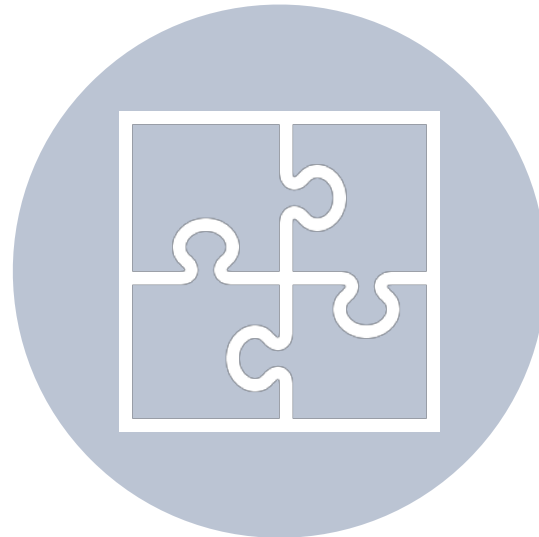
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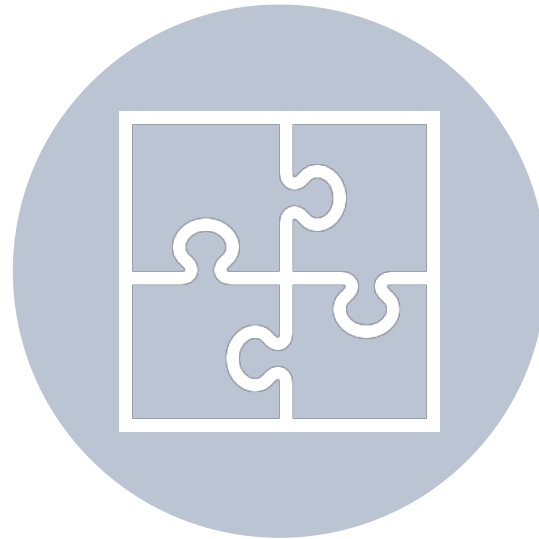
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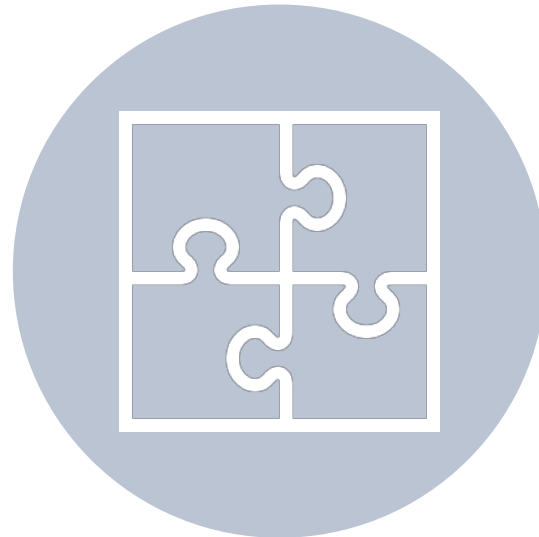
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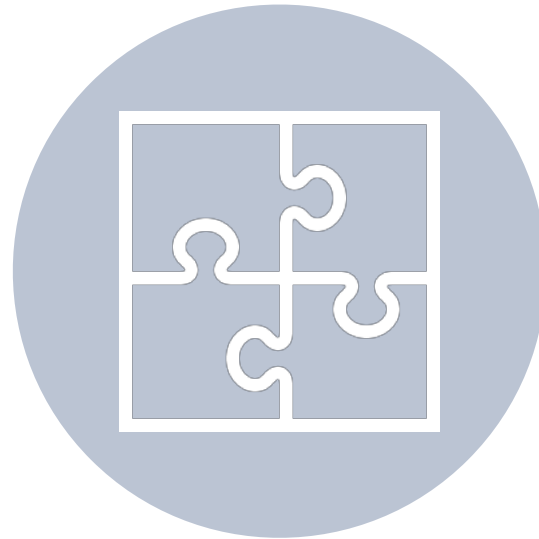
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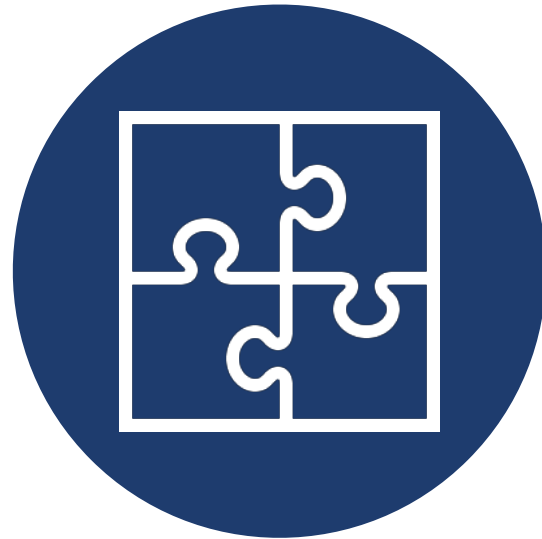
BENEFITS FOR EMPLOYERS



BENEFITS FOR EMPLOYERS



BENEFITS FOR EMPLOYERS



Laura Brown
SERVICE DEVELOPMENT
EXECUTIVE

||||
Skills
Development
Scotland

Graduate Apprenticeships: The story so far...

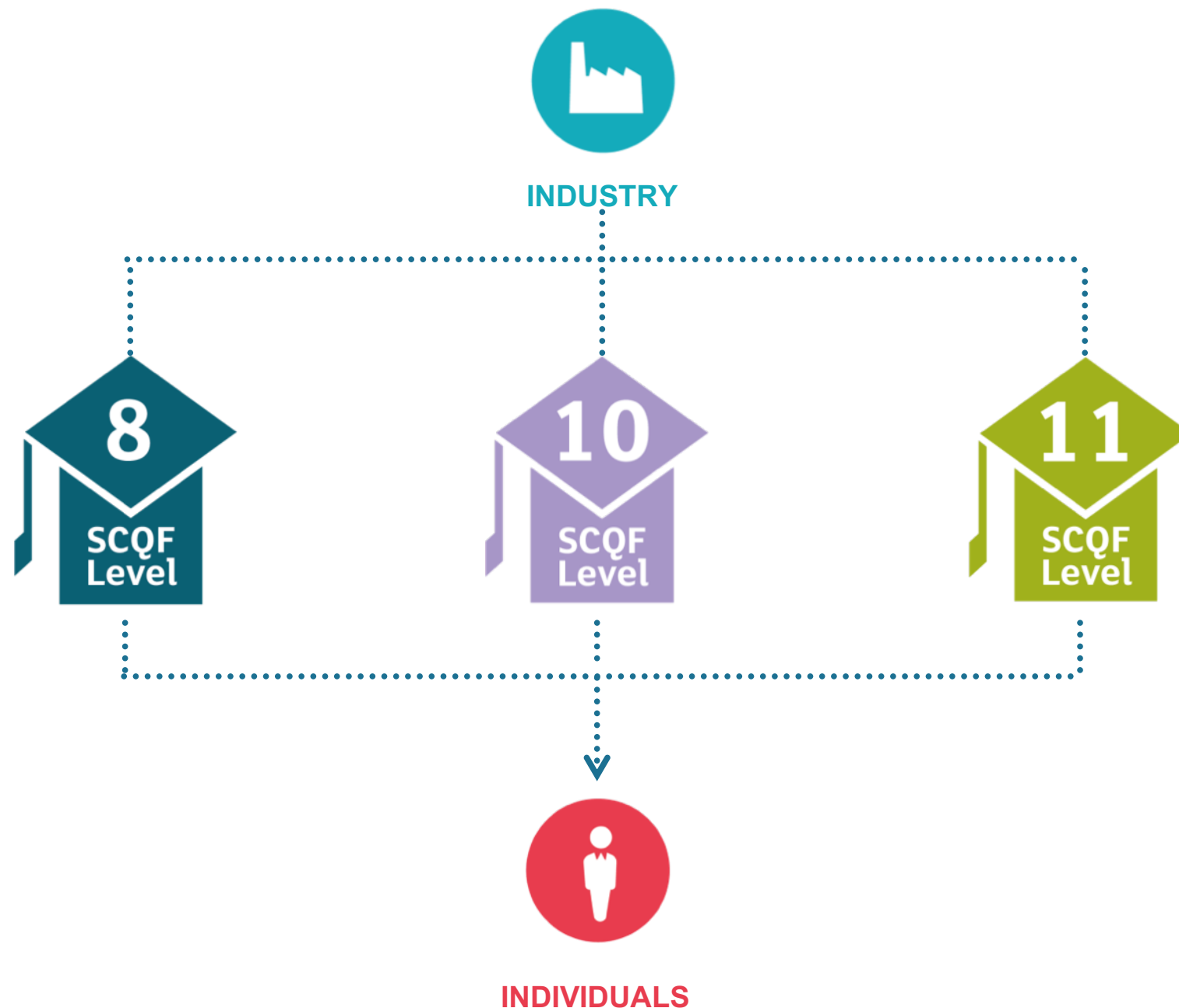
Laura Brown
Service Development Executive,
Service Design and Innovation

What we will cover:

1. What is a Graduate Apprenticeship?
 2. Why GAs in Scotland?
 3. How are we developing GAs?
 4. What to expect from a GA experience?
 5. What are the benefits of a GA?
 6. Where are we now?
 7. Our Future Plans
- 

What is a Graduate Apprenticeship?

GAs are **work-based** graduate apprenticeship programmes which are offered at **SCQF levels 8, 10 and 11**.



Why GAs in Scotland?

Countries with **effective work-based learning systems** show **correlation** between:



higher levels of
economic growth



lower levels of **youth unemployment**

Skills demand by 2022 shows **opportunities in sectors including engineering, science and healthcare** will demand qualifications from **SCQF level 8 and above**.

72%

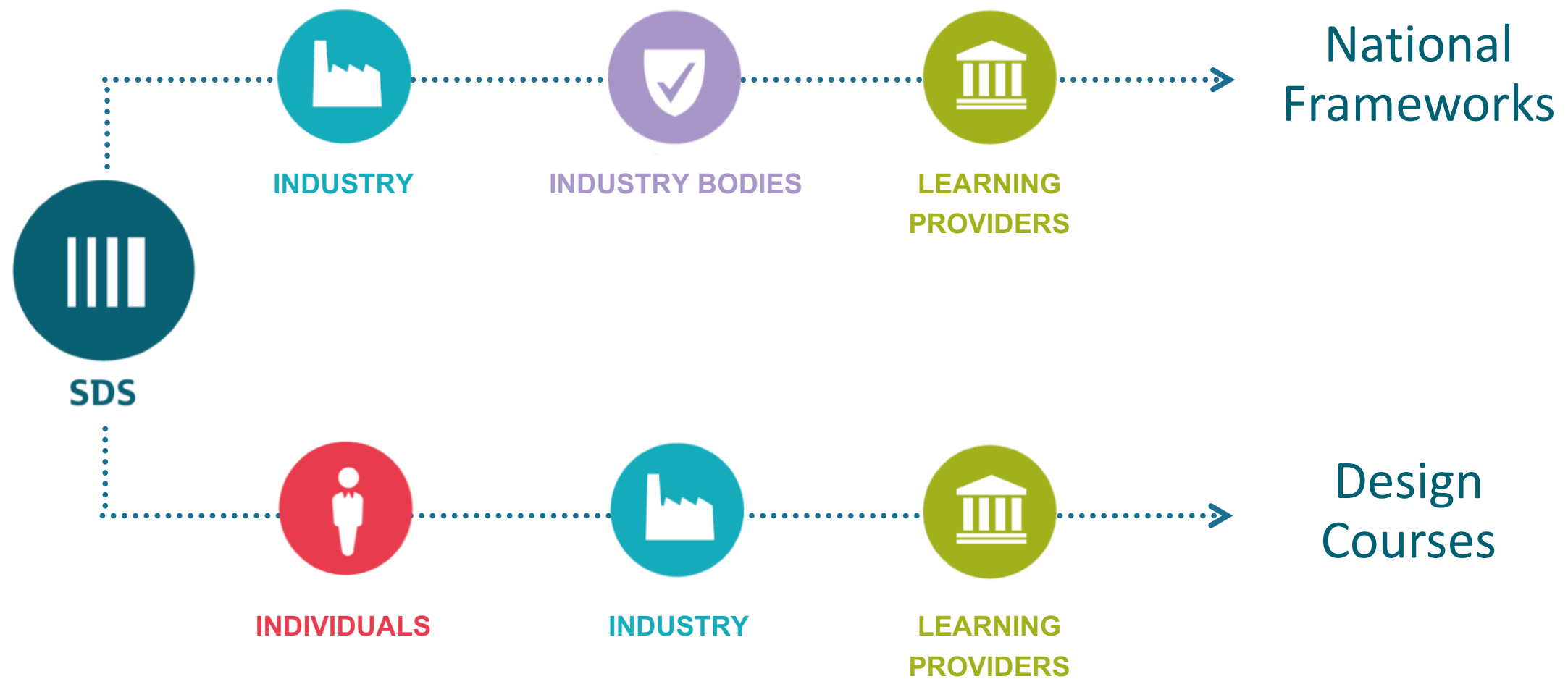
of employers reported a
**lack of technical, practical
or job specific skills**

42%

of companies have had
to **reallocate work to
address skills gaps**

How are we developing GAs?

GAs are **designed by industry, for industry.**



What to expect from a GA experience?



INDUSTRY EMPLOYER



A qualification **designed by industry, for industry**



No additional costs other than the apprentices salary



Choose a **course that meets your business needs**



Involvement in **mentoring and support of the apprentice**



Involvement in the **assessment** of work based learning



INDIVIDUALS



Paid full-time employment with **80% of learning** in the workplace



Recognition of prior learning and experience for entry



Access to university facilities, support services and online learning



A **flexible learning timetable** with **assessments based on workplace learning**



An **academic and workplace mentor**

What are the benefits of a GA?



INDUSTRY EMPLOYER

Plan for and meet your **skills needs**

Brings **new skills and knowledge** into your business

Access to a **diverse talent pool**

Develop networks with colleges and universities

Retain employees by investing in their professional development



INDIVIDUALS

Paid full-time employment for the duration of the GLA

Learning is contextualised in the workplace

Available to those who already have a degree

Gain **transferable, industry recognised skills**

Available to anyone **over the age of 16**

Where are we now?

Creation of around 900 **Graduate Apprenticeship opportunities across 11 frameworks by September 2018**



IT:
Management
for Business
SCQF 10



IT:
Cyber
Security
SCQF 10



IT:
Cyber
Security
SCQF 11



IT:
Software
Development
SCQF 10



Business
Management
(Financial
Services)
SCQF 10



Business
Management
SCQF 10



Engineering
Instrumentation
Measurement
& Control
SCQF 10



Engineering
Design &
Manufacture
SCQF 10



Civil
Engineering
SCQF 8



Civil
Engineering
SCQF 10



Construction
& The Built
Environment
SCQF 10



Our Future Plans



**4,000 Graduate Apprenticeships
by 2020**

.....

Graduate Apprenticeships
are **embedded in career guidance**

.....

**Offered by a range of learning
providers across Scotland**

.....

Key role in **delivering skills
for Scottish industry**

How can I get involved?

Visit www.apprenticeships.scot for the most up to date information on frameworks and learning.



Laura Brown
SERVICE DEVELOPMENT
EXECUTIVE

||||
Skills
Development
Scotland

PRINCIPLES

PRINCIPLES

- **first class degree**, not a second-class citizen, with students expected to attain existing academic tariffs.
- world changing curriculum devised through **equal partnership** with industrial collaborators.
- close **community of practice** where apprentices can share and discuss ideas, concepts and experiences.
- learning and assessment informed by the **challenges** of industry and the **opportunities** of research.

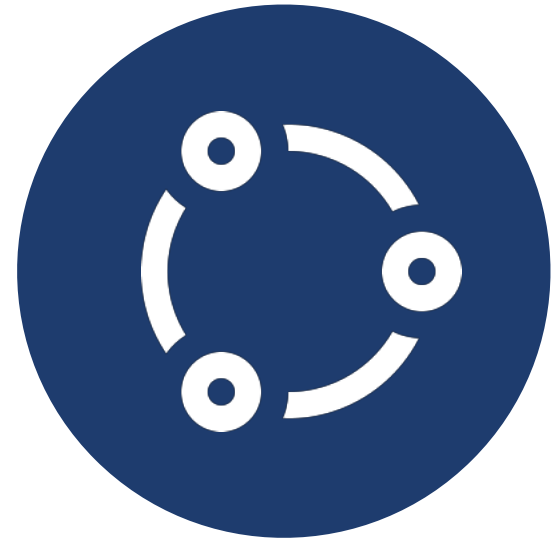
VISION

VISION

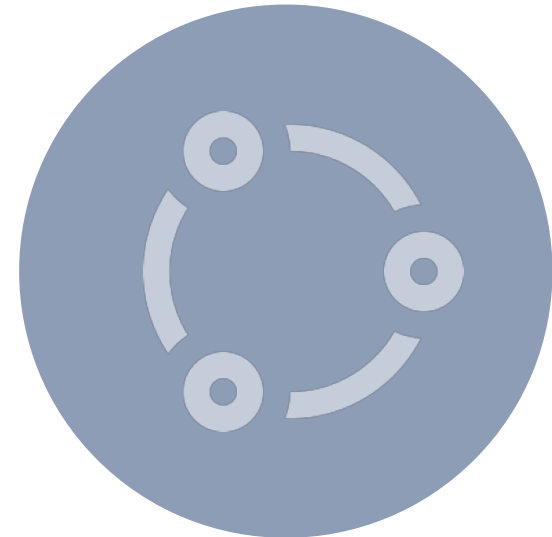
- work-based learning to form the basis of a new professional degree.
- utilise Skills Development Scotland (SDS) framework to support development of new professional degree.
- collaborate with industry to form a degree that produces professional software engineers.
- collaborate with government to strengthen legal context to ensure strong reputation for software engineering in Scotland.

POSSIBILITIES

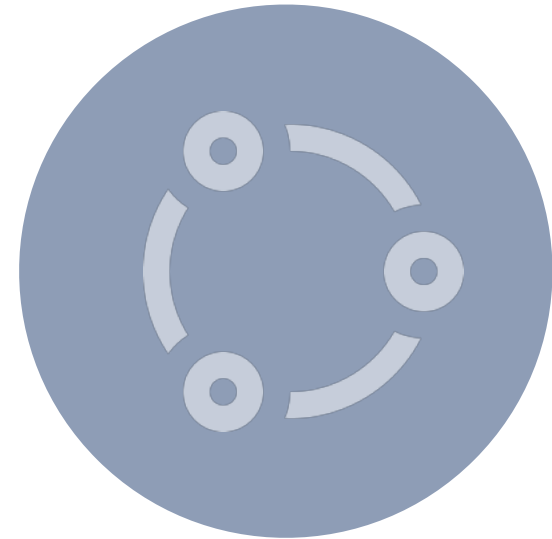
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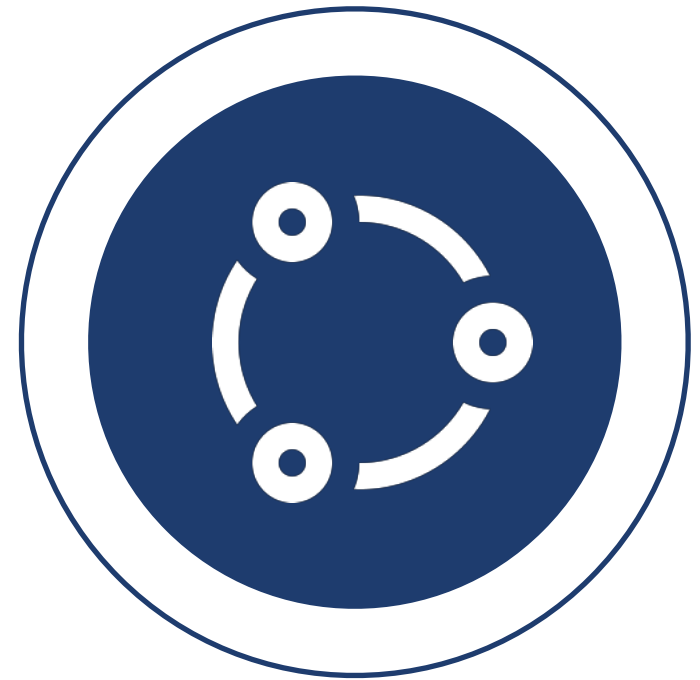
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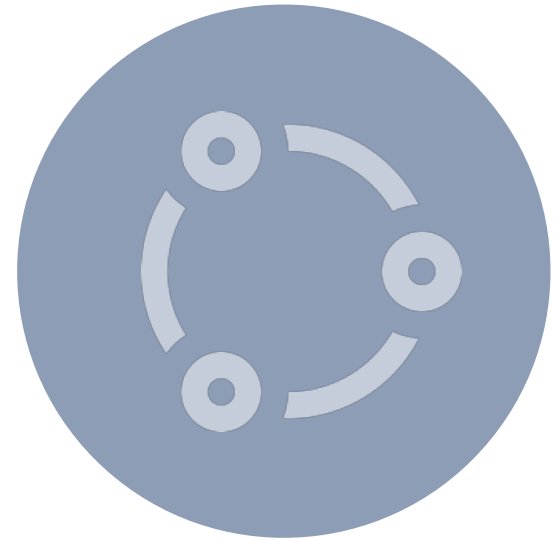
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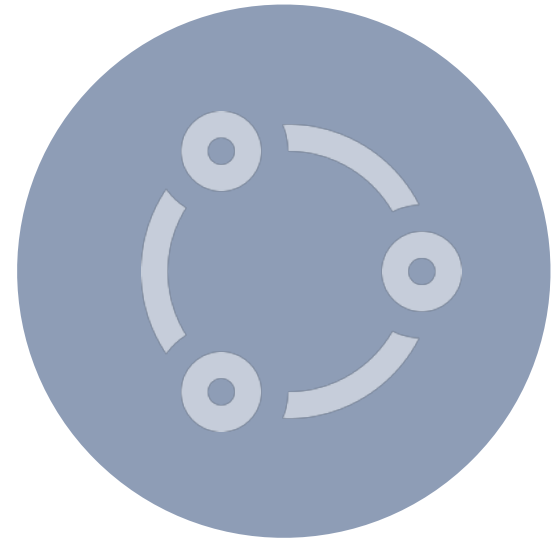
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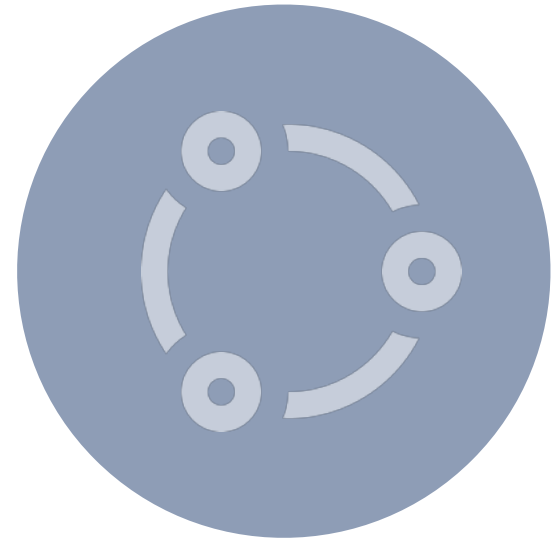
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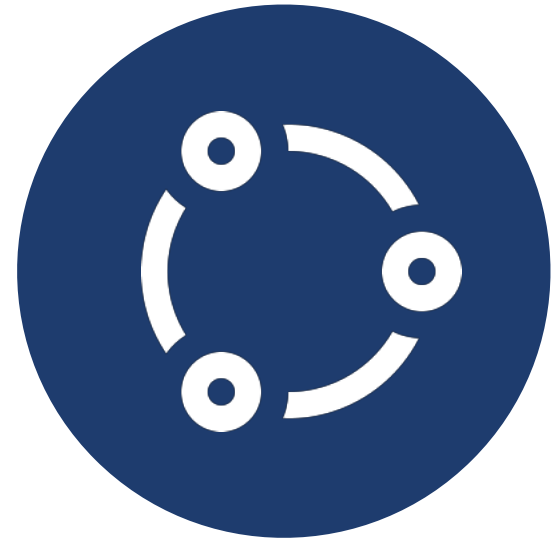
POSSIBILITIES



POSSIBILITIES



POSSIBILITIES



Colin Jack
SOFTWARE ENGINEERING
SUPERVISOR



Apprenticeships at Leidos

Colin Jack – Software Dev Team Lead
Aidan Davis – Apprentice Developer

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Leidos?

32,000 employees globally

In the UK we provide IT and Management services and solutions to the following sectors:



2013

- ▶ Considering Software Developer Modern Apprenticeships
 - What can they work on?
 - How much support do they need?
 - Can our jobs be done without a degree?
- ▶ Little available advice
 - Treat them like a graduate?
 - Give it a go?
 - My Team

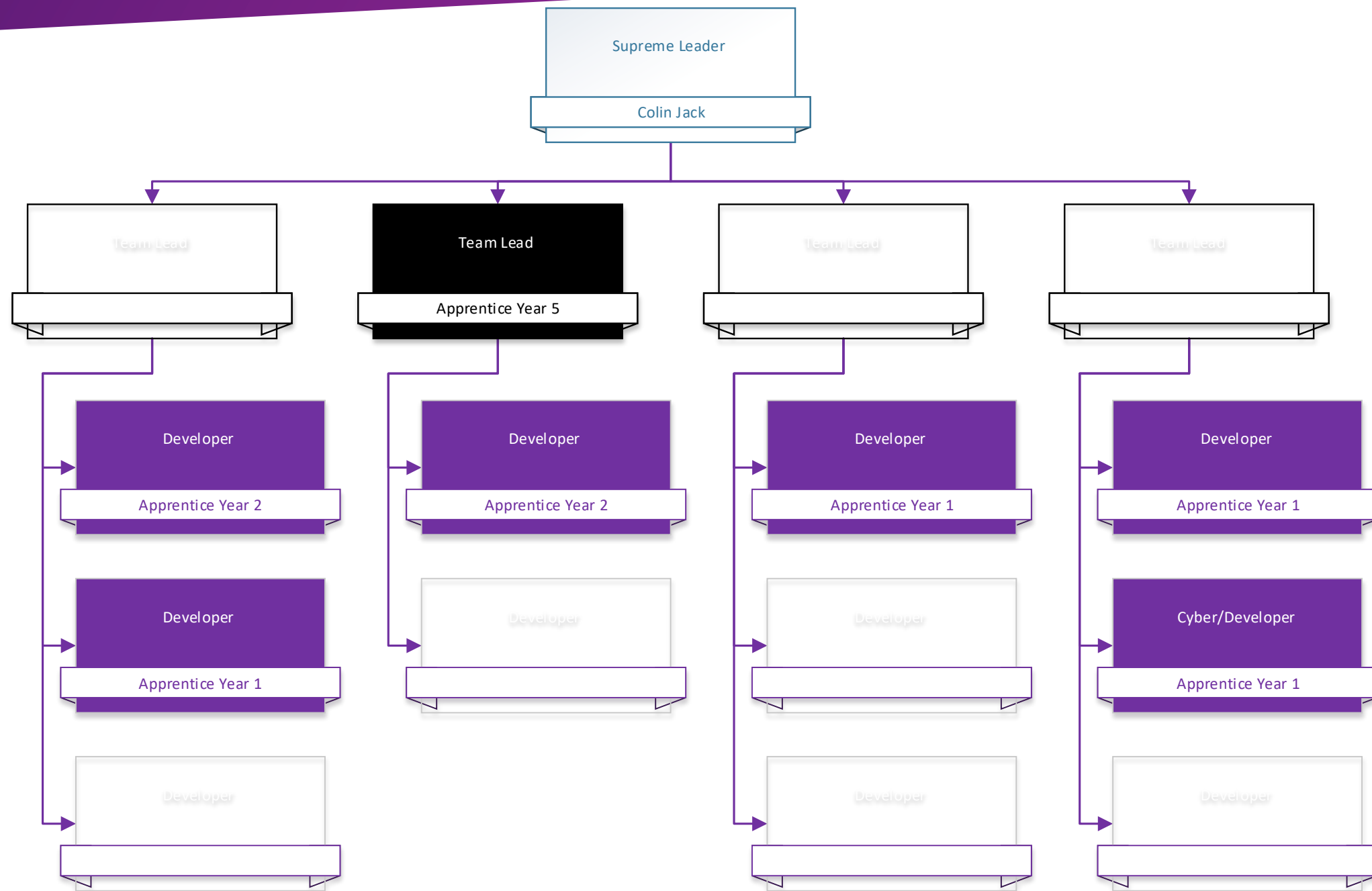
Daniel Morrison

- ▶ Our First Developer Apprentice
 - The Guinea pig
- ▶ Winner of Microsoft Modern Apprentice of the Year 2015
- ▶ Now designing solutions and leading teams of developers



Present Day

- ▶ Structured Apprenticeship Program
 - Hiring 5-7 apprentices per year in Glasgow
 - Developers, IT, Cyber, Support, Facilities and Project Management
 - Salary Plan and Mentor
- ▶ Graduate Apprenticeships
 - Rewards work based learning
 - Full BSc (Hons) + 4 years of work experience
 - Broaden experience of apprentices



How to Train Your Apprentice

- ▶ Pair with a strong mentor
- ▶ Real work from day one
 - Start with small dev tasks
- ▶ Reduce supervision over time
 - Heavy supervision 3-6 months
 - Every apprentice is different

Part of the team



Benefit to Leidos

- ▶ Quality
 - Question everything
 - Different perspective
- ▶ Collaboration
- ▶ Community
- ▶ Hard workers
- ▶ Rewarding experience for mentors

My Apprenticeship at Leidos

8 MONTHS IN

Aidan Davis



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Why I chose an Apprenticeship

- ▶ Background
- ▶ School life
- ▶ QA Apprenticeships

My first week


- ▶ The buddy/mentor system
- ▶ Being part of the team
- ▶ Real work

Current Focus

- ▶ Vue.js – SPA Framework



Debt Arrangement Scheme



HomeCasesUserDocuments

Quick SearchSearch

2018/900007

Eligibility

Statement

Income

Salary and Wages

Pensions

Other

Benefits

Expenditure

Essentials

Phone

Travel

Housekeeping

Other

Payment

Agreement

Method

Conditions

Agreement

Terms

Considerations

Declaration

Signature

ADVISOR

DEBTOR(S)

ELIGIBILITY

DEBT

STATEMENT

PAYMENT

CONDITIONS

CONSIDERATIONS

DECLARATIONS

SIGNATURE

Income - Salary and Wages

Description	Frequency	Amount (£)	Notes
Debtor's salary/wages	Every week	0	
Partner's salary/wages	Every week	0	
Benefits	Every 4 weeks	200	
MONTHLY TOTAL:		£216.67	

Next

New starts and work experience students

- ▶ Teaching Vue.js
- ▶ Working on development tasks
- ▶ Team building

QA Modern and Graduate Apprenticeships

- ▶ Training sessions
- ▶ Regular visits
- ▶ Starting University
- ▶ Plans for the future

Would I recommend it to others?

- ▶ Benefits of an apprenticeship
- ▶ My experience so far

Questions?

COLIN.JACK@LEIDOS.COM

Colin Jack
SOFTWARE ENGINEERING
SUPERVISOR

Aidan Davis
APPRENTICE DEVELOPER



CONSULTATION

CHALLENGES

CHALLENGES

- Grab a tea/coffee and a seat.
- Consider the challenges work-based learning raises for your organisation - key stakeholders?
- What processes, policies and practices does your organisation need to navigate?
- Culture and legal concerns?

CHALLENGES

CHALLENGES

privacy

staging

research
opportunities

Intellectual
property

timetabling

balance of theory
and practice

Ironing

practices and
activities

interprofessional
learning

LEADING PARTNERS

LEADING PARTNERS

- since December 2016, we have been consulting with industry about the potential for work-based learning.
- developed an understanding regards the opportunities and challenges of work-based learning.
- now seeking to expand the consultation process to consult a wider community of employers seeking professional software engineers.
- on-going discussions about the academic tariff, timetabling, staging, curriculum as well as assessment and feedback strategies.

JPMORGAN



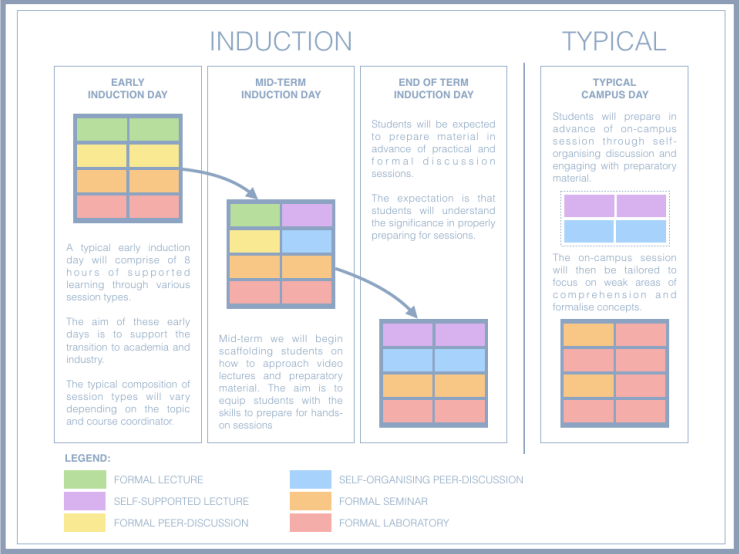
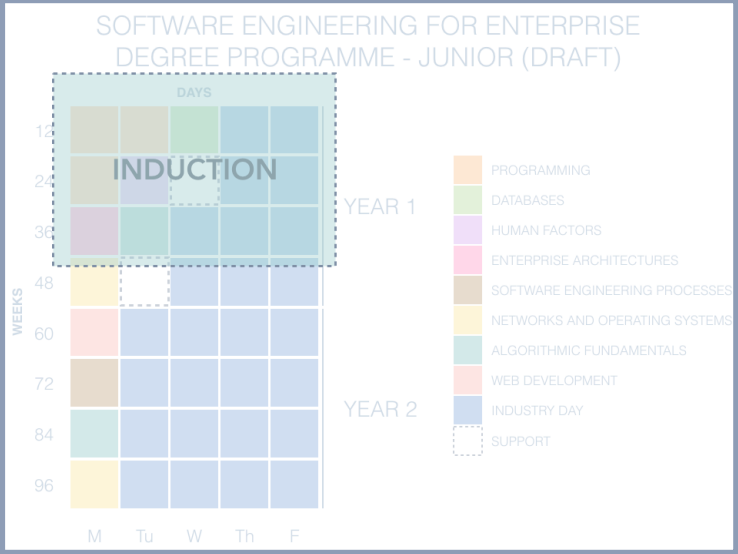
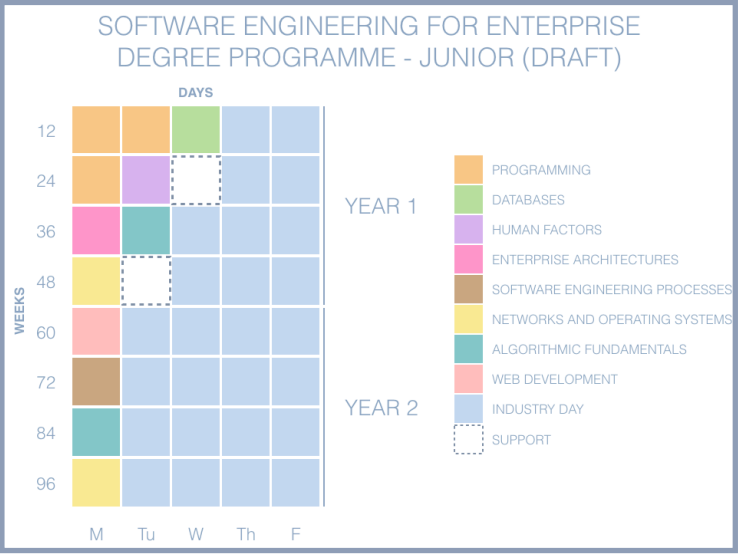
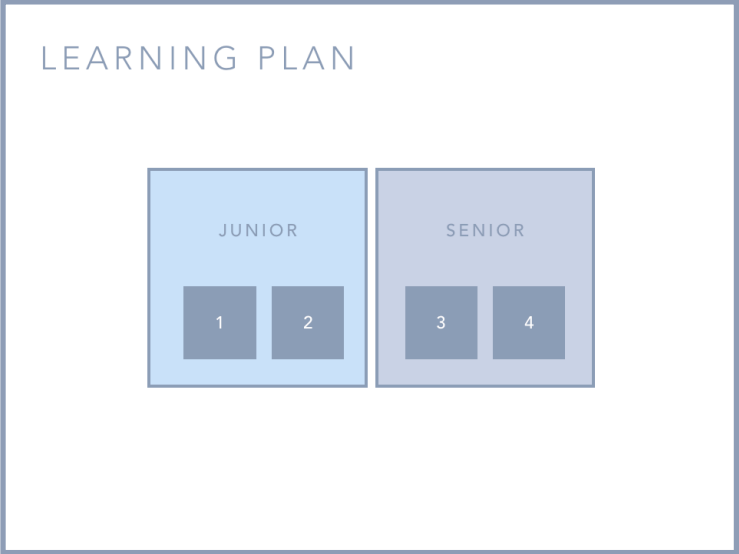
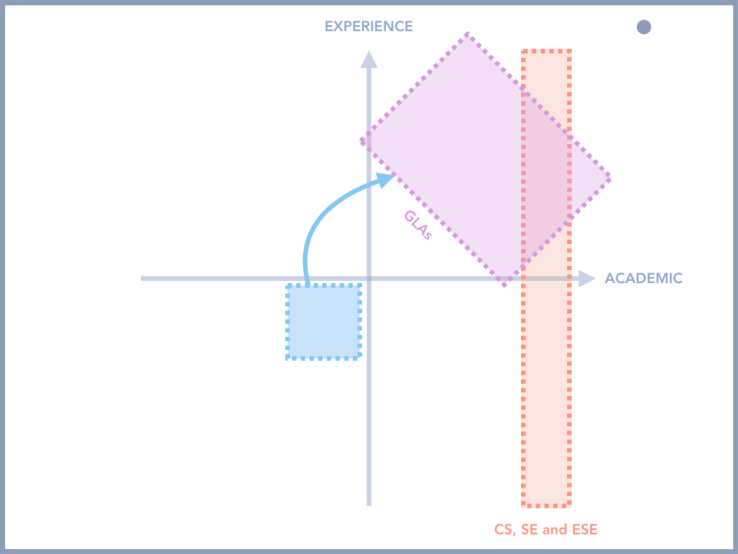
Morgan Stanley



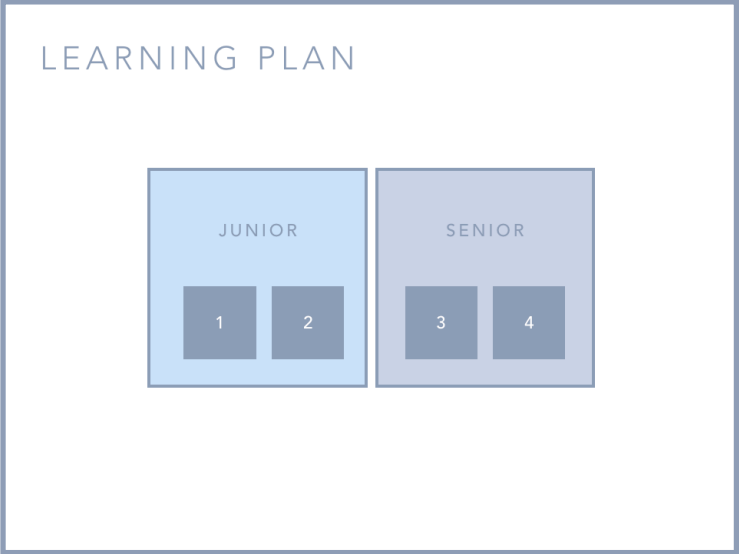
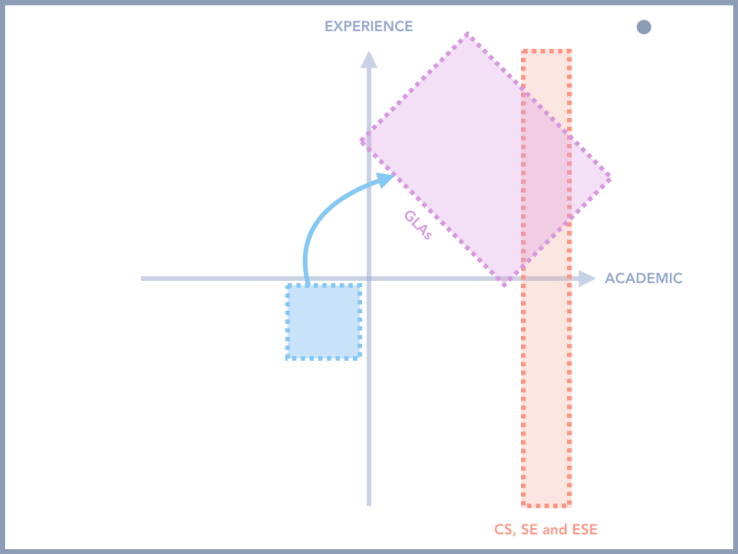
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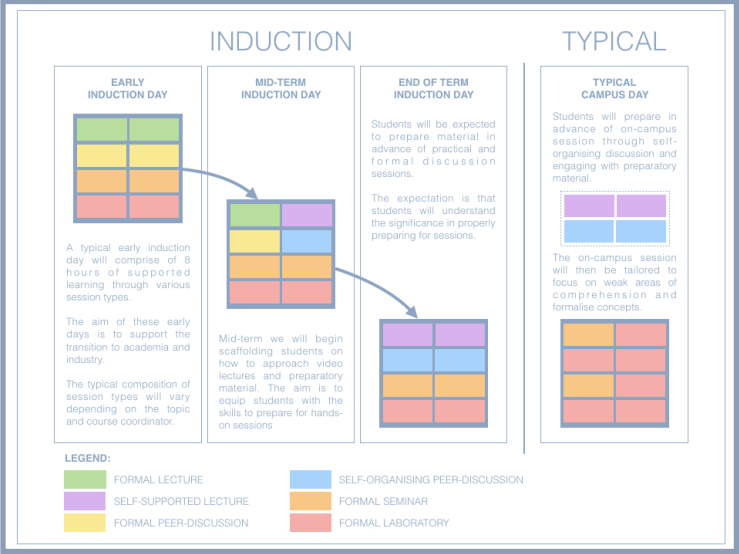
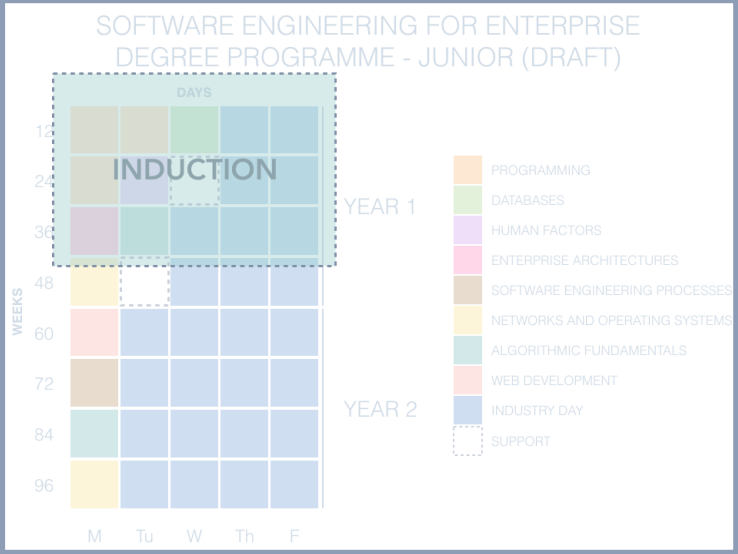
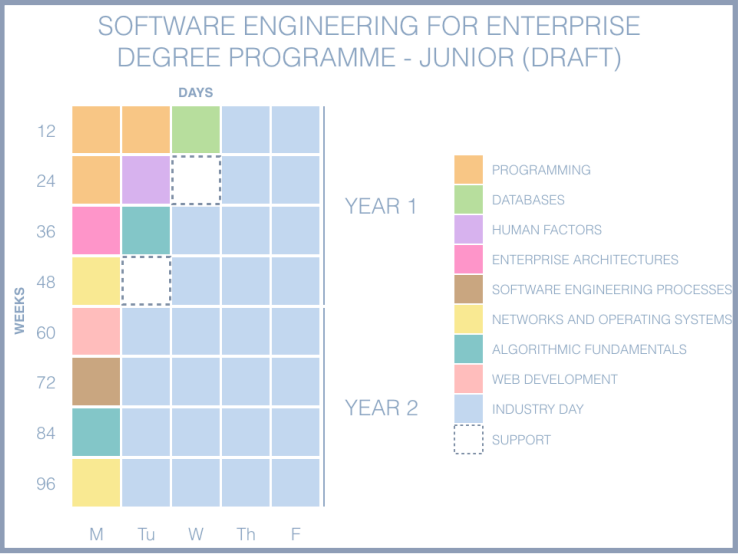
INITIAL CONSULTATION



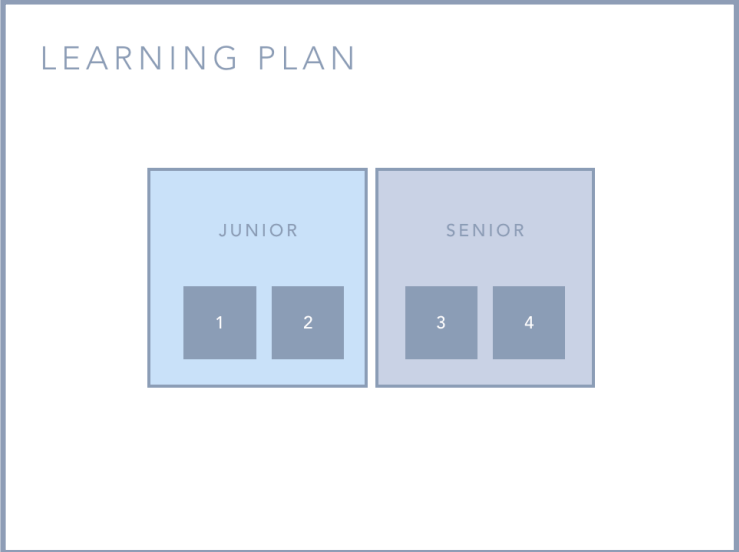
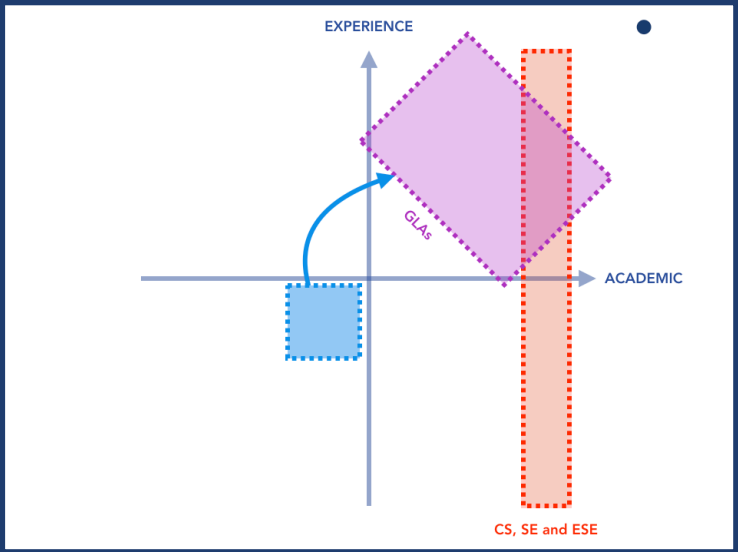
INITIAL CONSULTATION



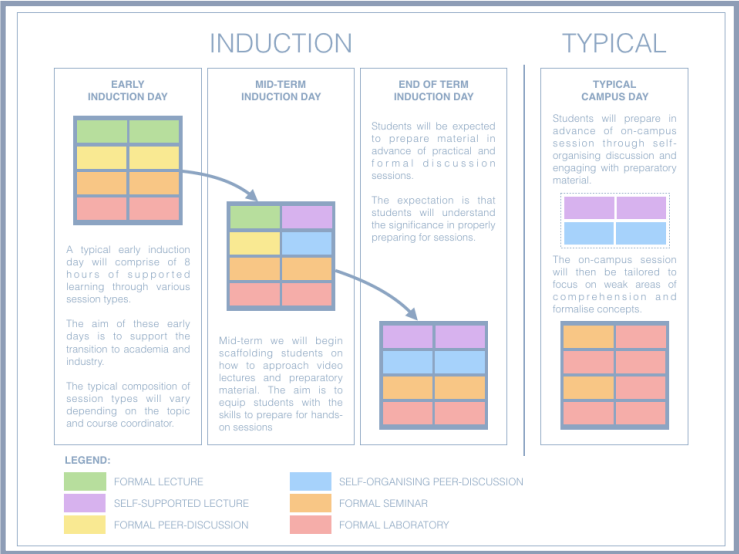
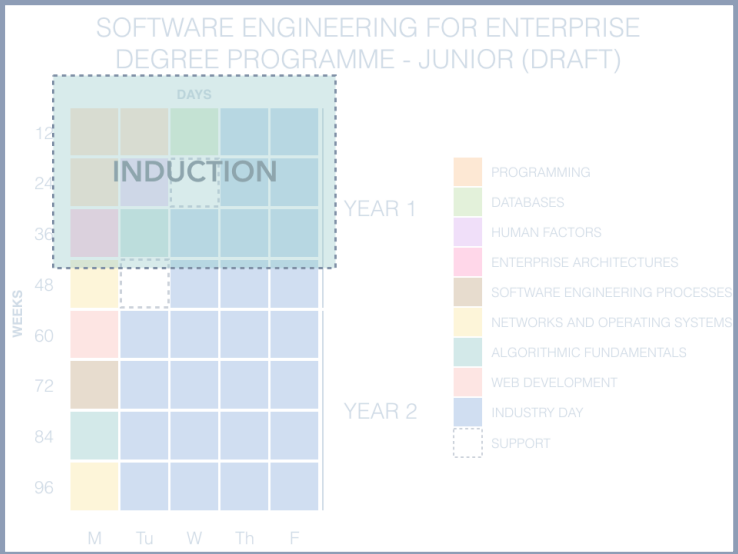
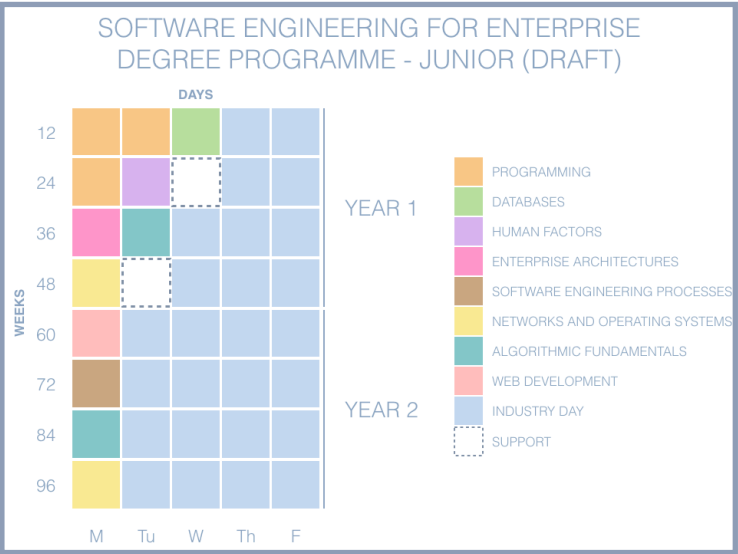
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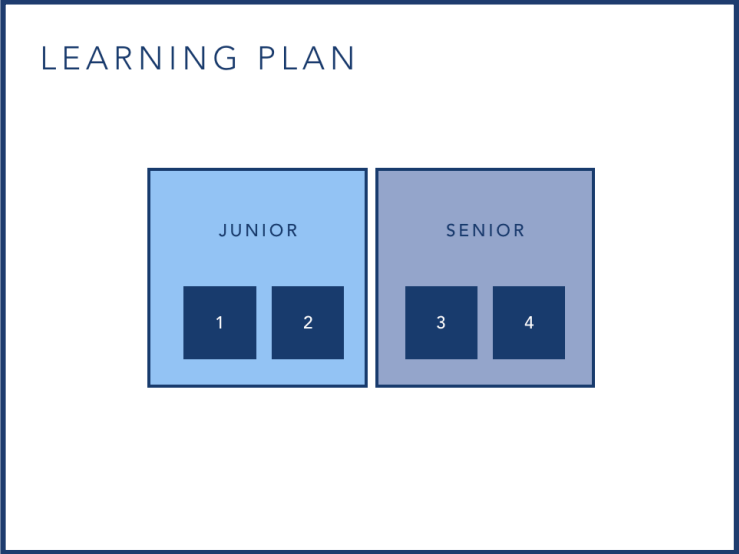
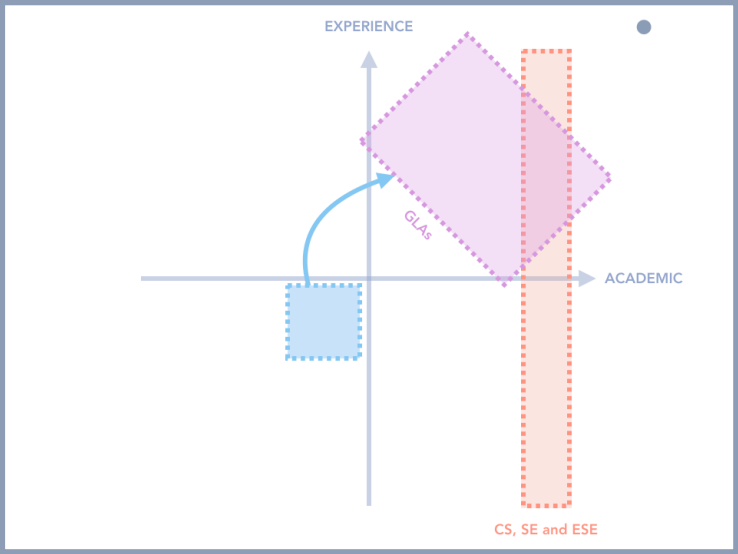
INITIAL CONSULTATION



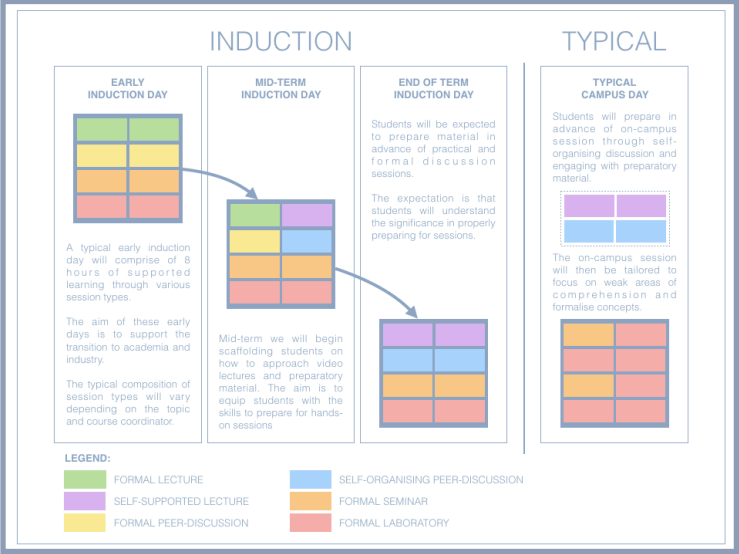
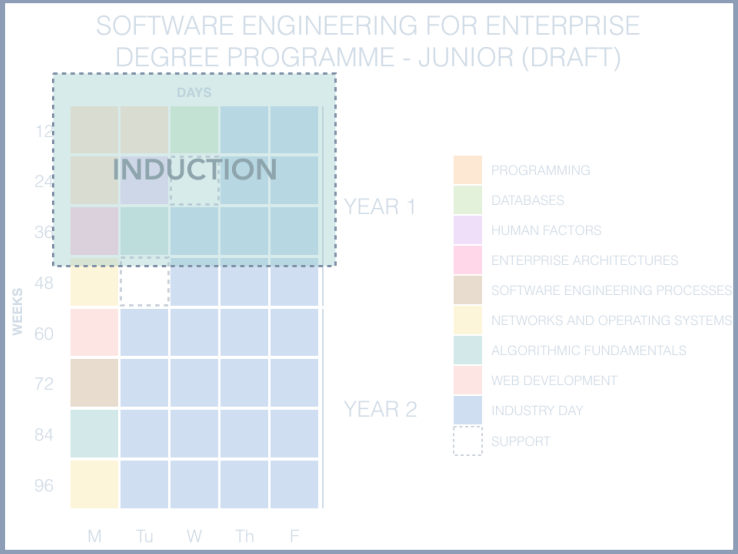
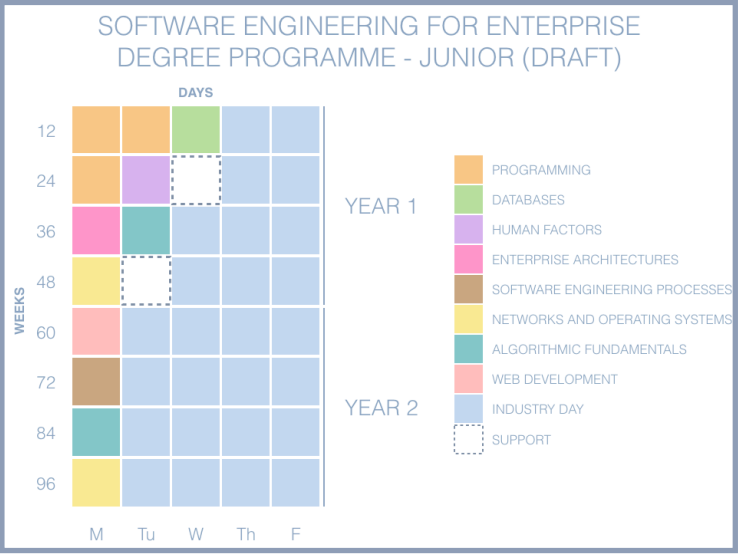
EXPERIENCE



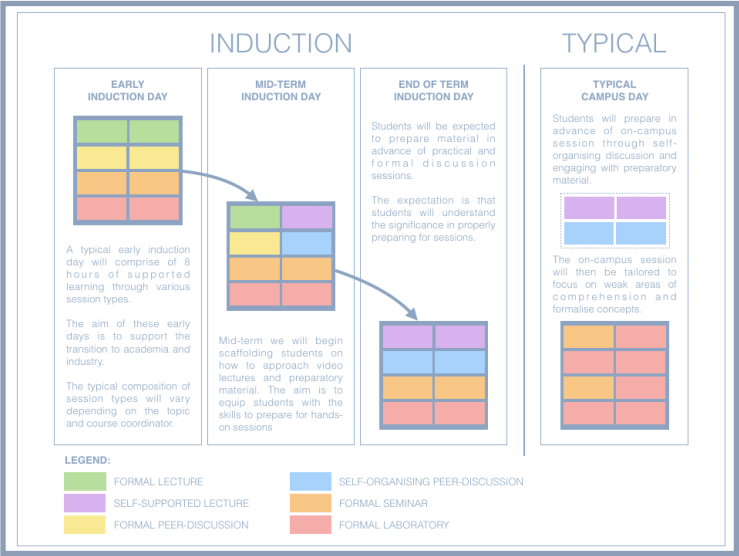
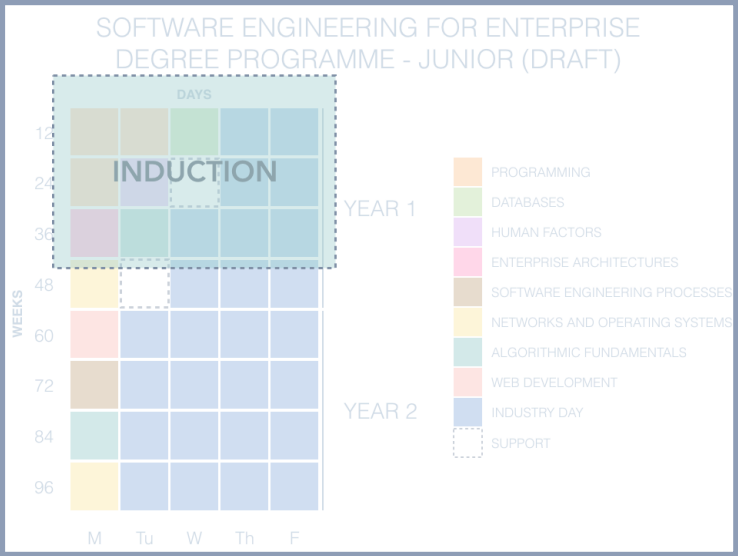
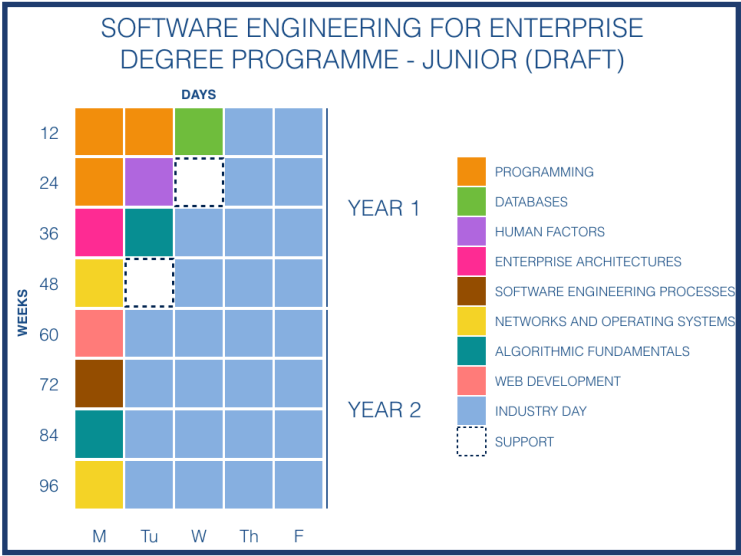
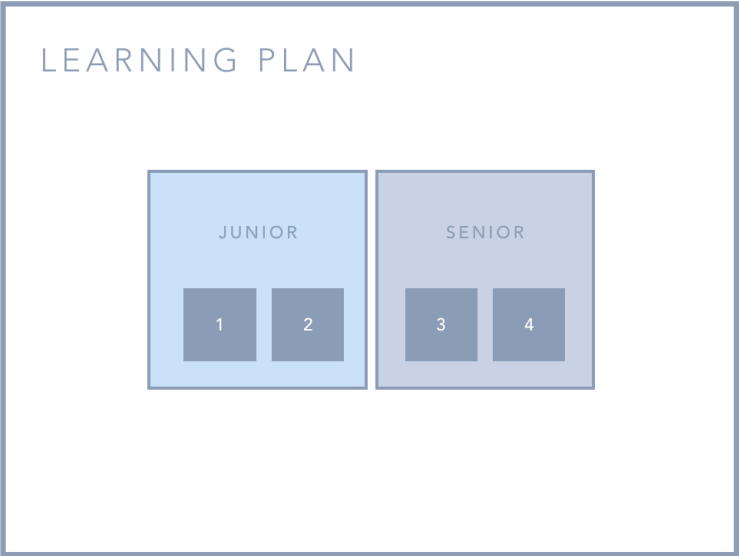
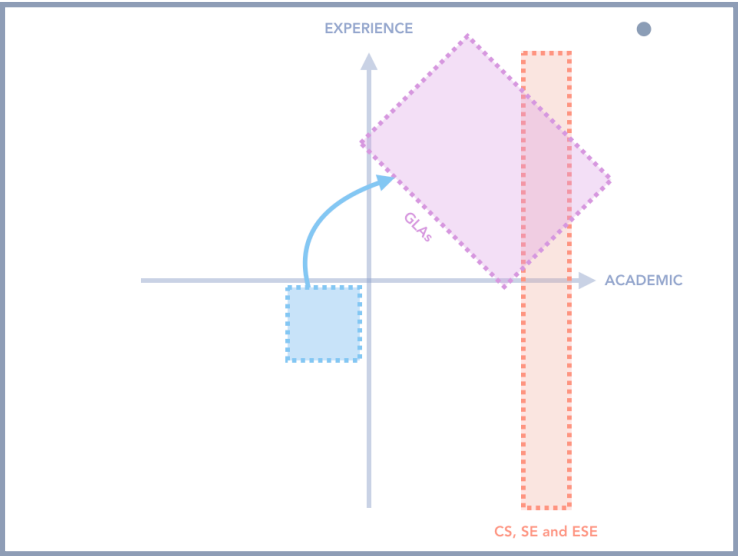
INITIAL CONSULTATION



LEARNING PLAN

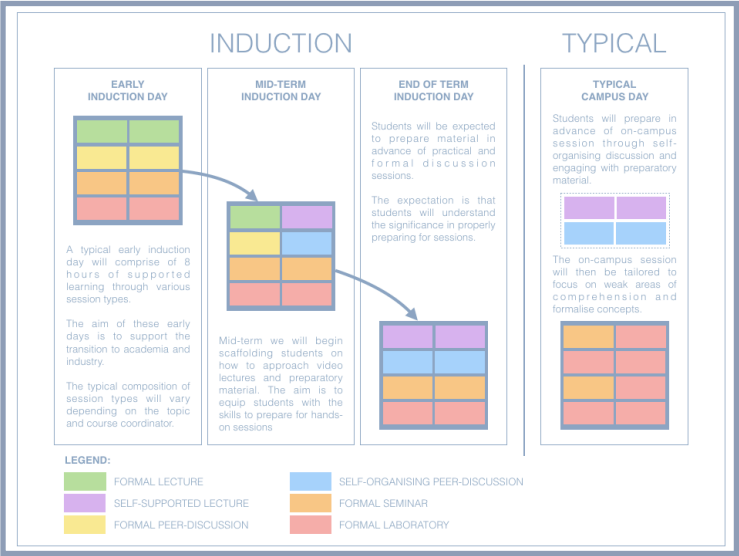
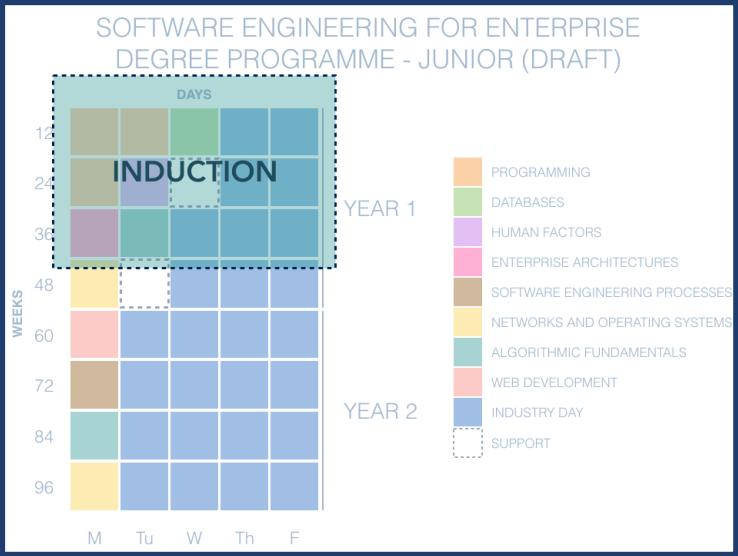
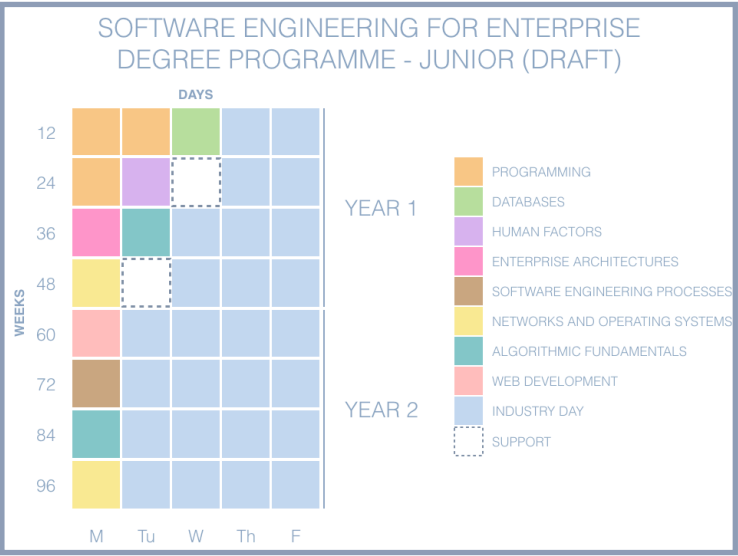
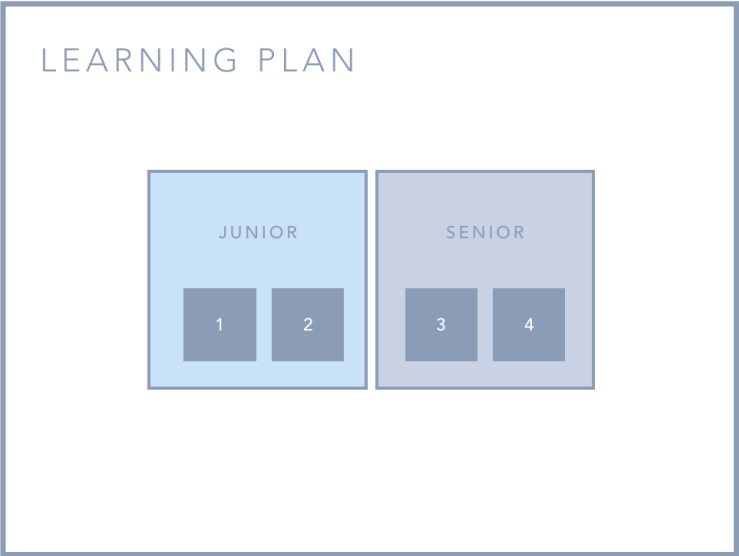
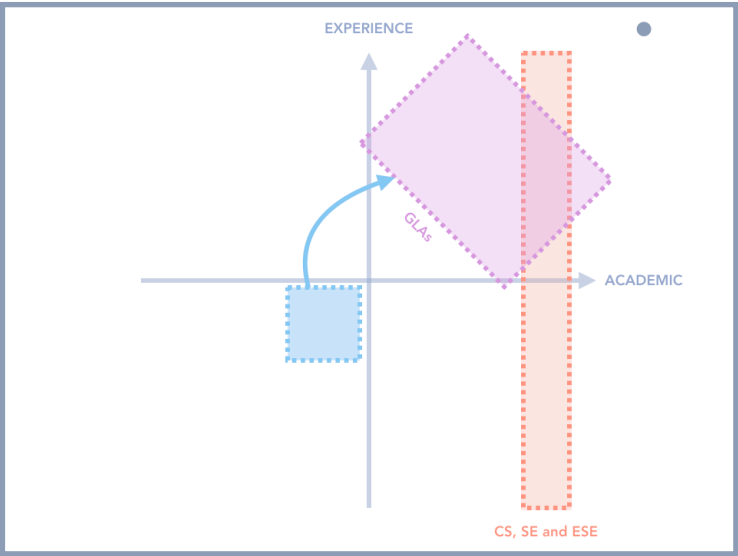


INITIAL CONSULTATION



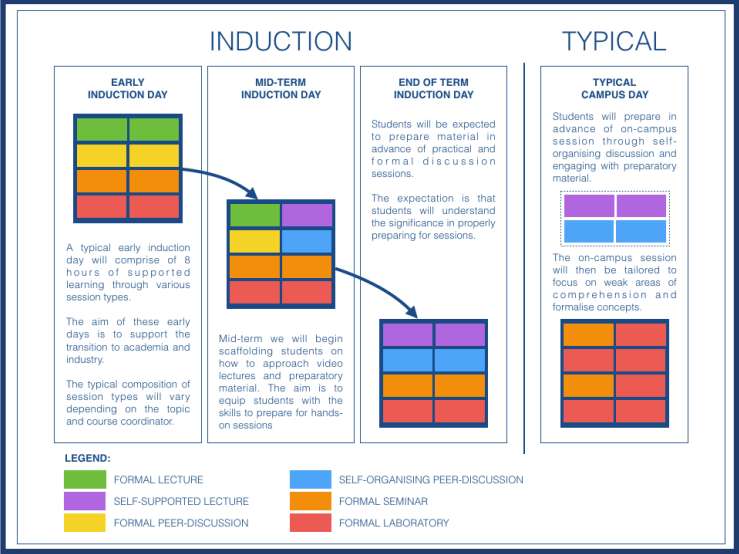
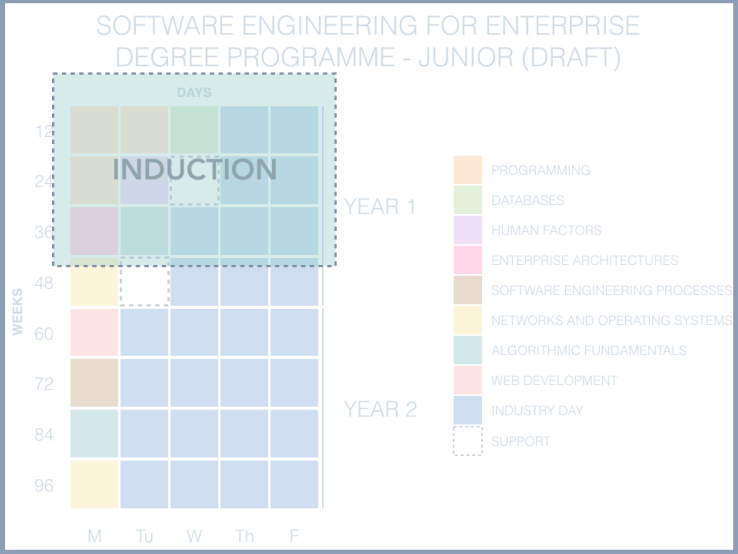
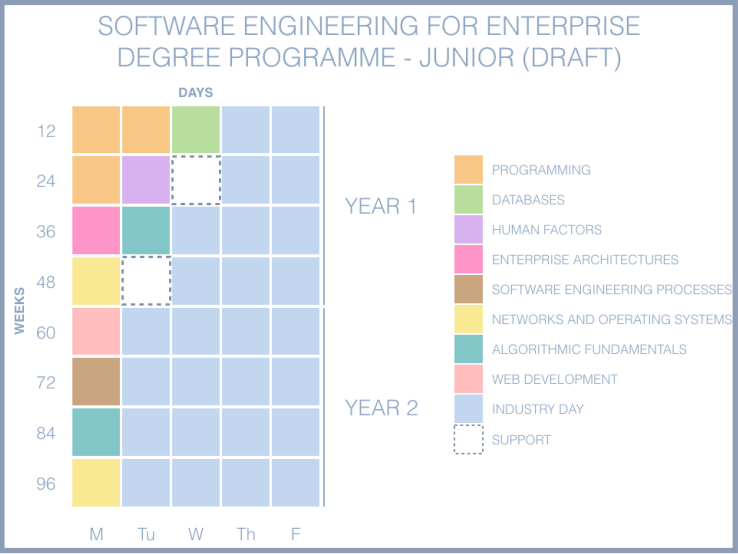
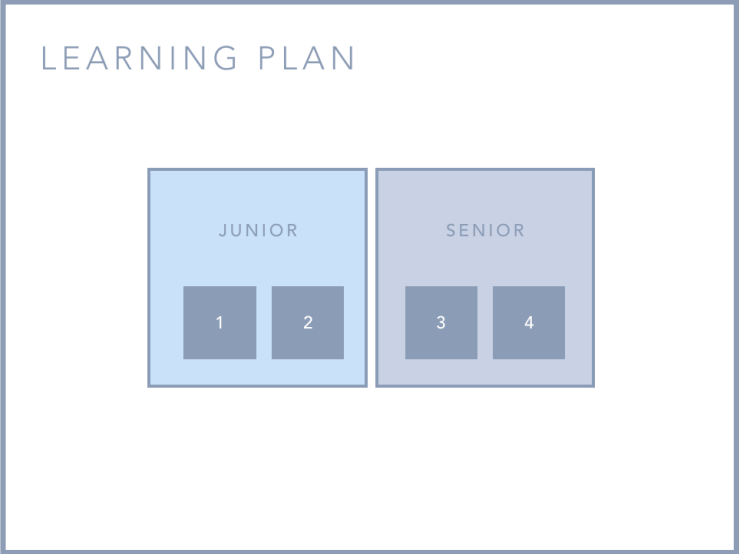
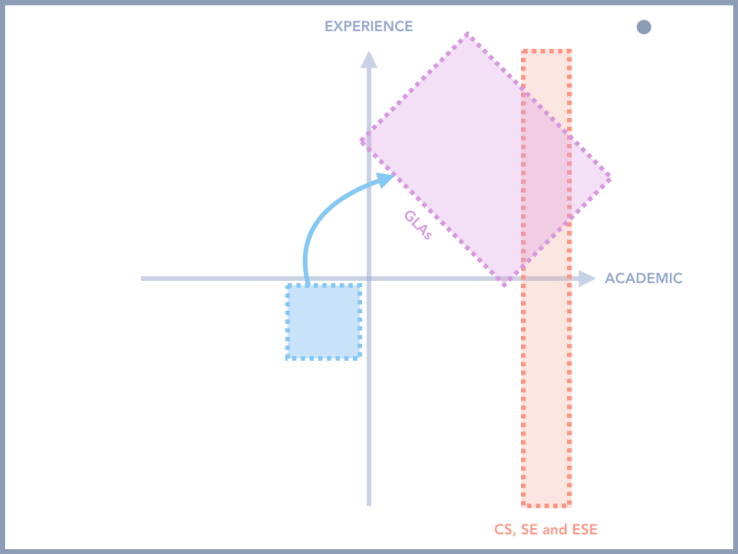
CURRICULUM

INITIAL CONSULTATION



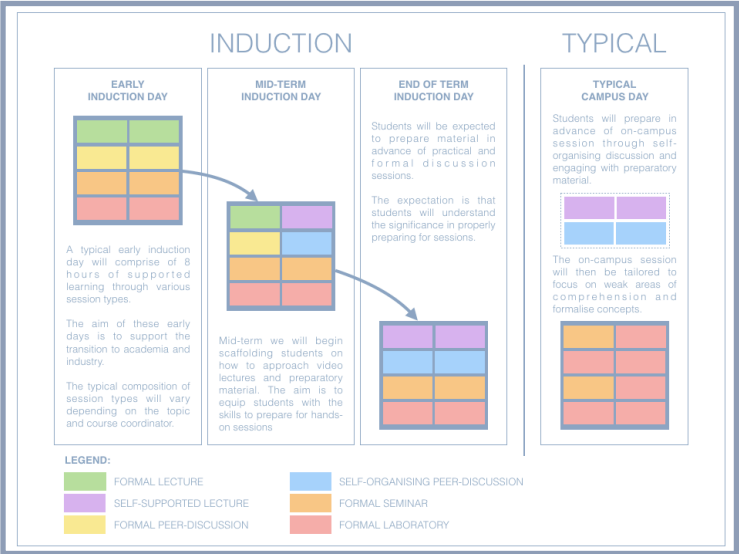
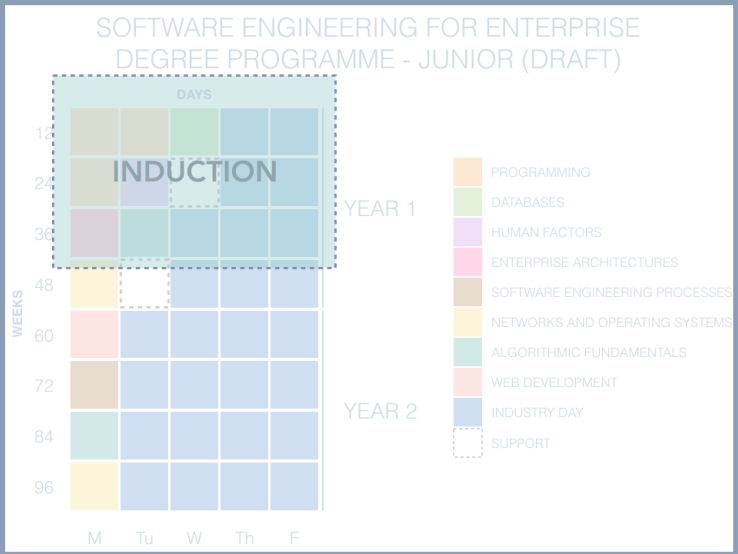
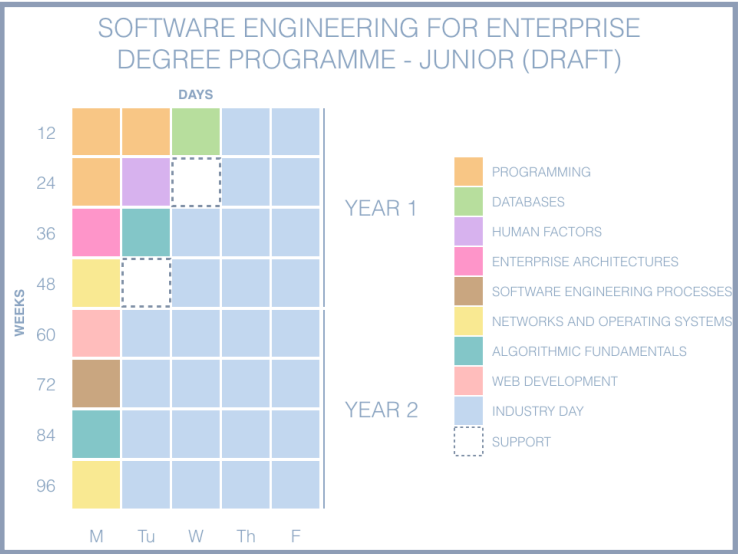
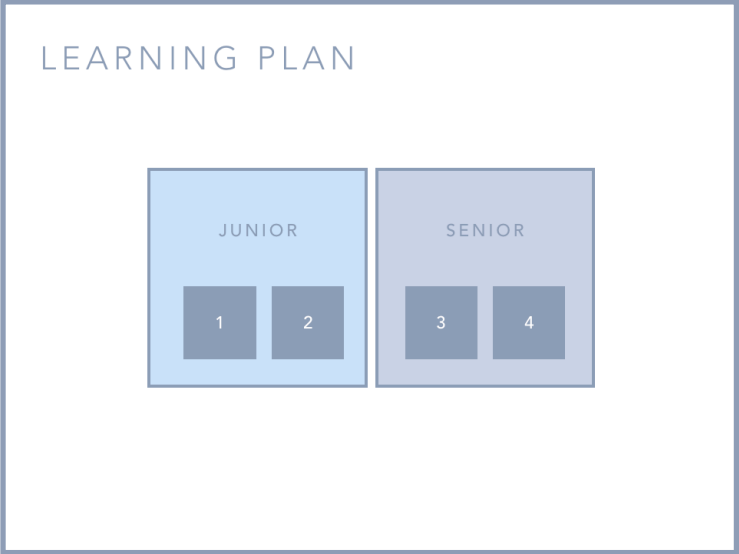
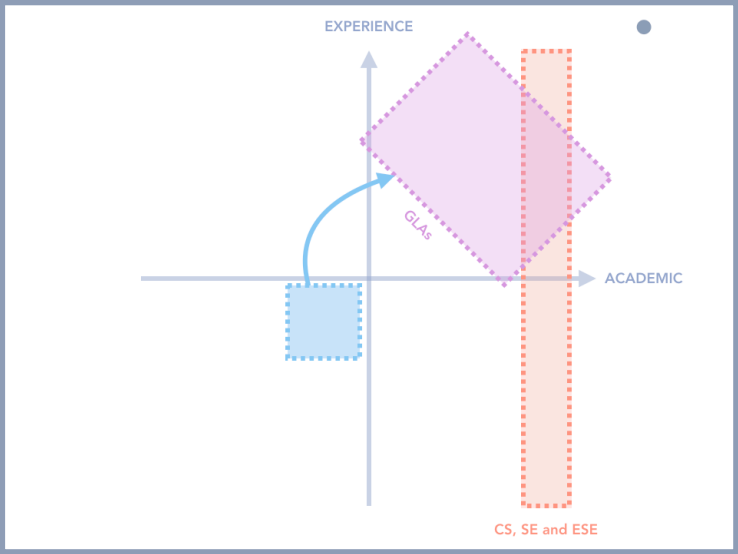
STAGING

INITIAL CONSULTATION



GUIDANCE

INITIAL CONSULTATION



INTERNATIONAL BEST PRACTICE



OSTBAYERISCHE
TECHNISCHE HOCHSCHULE
REGENSBURG





OSTBAYERISCHE
TECHNISCHE HOCHSCHULE
REGENSBURG

PERCEPTIONS



University
of Glasgow

Centre for Computing
Science Education


CONSULTATION PROCESS

CONSULTATION PROCESS



QUESTIONNAIRE
DEVELOP AN
UNDERSTANDING OF THE
ORGANISATION OR
COMPANY

CONSULTATION PROCESS



SITE VISITS
VISIT ORGANISATION AND
CONSULT WITH WIDER
STAFF ABOUT THE
POTENTIAL FOR WORK-
BASED LEARNING

CONSULTATION PROCESS



MODEL REFINEMENT
PRESENT MODEL AND
POTENTIAL SOLUTIONS FOR
FEEDBACK

JPMORGAN



Morgan Stanley



CONSULTATION PROCESS

- we want to begin the wider consultation process as soon as possible.
- consultation process is central to forming the foundation and partners for work-based learning degree.
- recruitment onto the programme will begin as early as **September 2018**.
- aspiration is to deliver the first year of the work-based learning programme in **September 2019**.

SUMMARY

- the aim of the University of Glasgow is to **cultivate a culture of learning.**
- School of Computing Science wants a degree plan that supports students to become **professional software engineers.**
- **consultation process** is designed to ensure a strong degree programme not only for students but industry as well.
- **call to action** to join us in forming this exciting new degree programme.

SIGN-UP
TALK TO OUR BUSINESS
DEVELOPMENT MANAGER.

JILL.RAMSAY@GLASGOW.AC.UK

www.ccse.ac.uk



University
of Glasgow